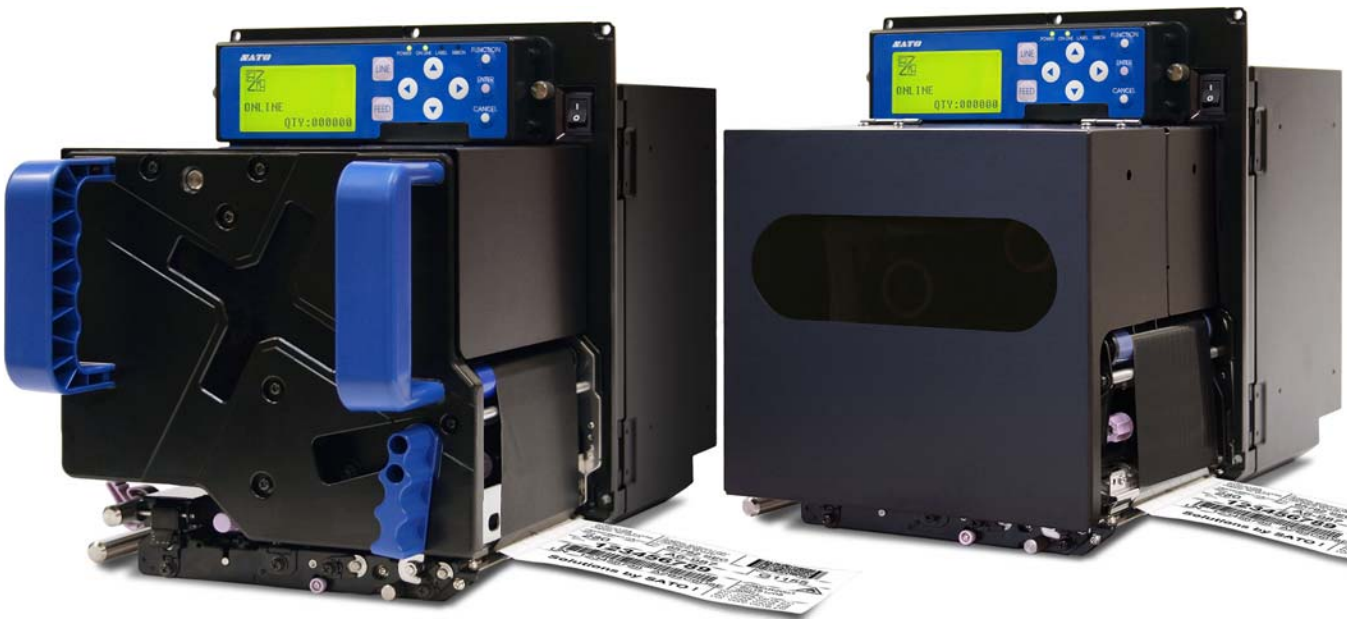
DCS & Labeling Worldwide

S8408/S8412/S8424
PRINTERS



SERVICE MANUAL

PN: 9001161A

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WARNING

THE EQUIPMENT REFERENCED IN THIS DOCUMENT COMPLIES WITH THE REQUIREMENTS IN PART 15 OF FCC RULES FOR A CLASS B COMPUTING DEVICE. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA MAY CAUSE UNACCEPTABLE INTERFERENCE TO RADIO AND TV RECEPTION.

PN: 9001161A

TABLE OF CONTENTS

INTRODUCTION

About This Manual 1-2
General Description 1-3
Theory Of Operation 1-4
Control Features 1-7

TECHNICAL DATA

Physical Characteristics 2-2
Power 2-2
Enviromental 2-2
Processing 2-2
Command 2-2
Interface Modules 2-2
Regulatory Approvals 2-2
Print 2-2
Media 2-3
Ribbon 2-3
Sensing 2-4
Character Font Capabilities 2-4
Barcode Capabilities 2-5

INTERFACE SPECIFICATIONS

Interface Specifications 3-2
RS232C High-Speed Serial Interface 3-3
IEEE1284 Parallel Interface 3-6
Universal Serial BUS (USB) Adapter 3-7
Local Area Network (LAN) Ethernet 3-8
802.11G Wireless 3-9
All Interfaces 3-11
External Signal 3-14

ACCESSORIES INSTALLATION

Interface Installation 4-2
Compact Flash Card 4-3
Remote Operator Panel 4-4

PRINTER CONFIGURATION

Printer Configuration 5-2
Configuration Modes 5-3
- User Mode 5-3
- Advanced Mode 5-4
- Parallel Interface Mode 5-5
- Serial Interface Mode 5-6
- Local Area Network (LAN) Interface Mode 5-7
- Universal Serial BUS (USB) Interface Mode 5-8
- Centronics Interface Mode 5-9
- Wireless LAN (Local Area Network) Interface Mode 5-10
- Service Mode 5-11
- Factory Mode 5-12
- Work Shift Mode 5-13
- Hidden Mode 5-14
- Download Mode 5-15
- Boot Download Mode 5-16
- Print Cancel Mode 5-17
- Default Settings Mode 5-18
- Test Print Mode 5-19
- Hex Dump Mode 5-20
- CF (Compact Flash) Card Mode 5-21
- Stand Alone Mode 5-22

Menu Definition Tables 5-23

TROUBLESHOOTING

Error Signal Troubleshooting 6-2
Warning Signal Troubleshooting 6-6
Troubleshooting Table 6-7
Interface Troubleshooting 6-9
- Parallel Interface 6-9
- RS232 Serial Interface 6-9
- Universal Serial Bus (USB) Interface 6-9
- LAN Ethernet Interface 6-10
- Wireless LAN Interface 6-10
- Centronics Interface 6-10

Performance Testing 6-11
- Multimeter w/Test Module 6-11
- Multimeter Alone 6-12

Test Print Troubleshooting 6-13
- Hex Dump Mode 6-13
- Test Label Printing 6-14
- Sample Test Label 6-15

REPLACEMENT PROCEDURES

Replacement Procedures 7-2
- Print Head 7-2
- Platen Roller 7-3
- Ribbon Rollers & Belt (Direct Load) 7-4
- Platen Drive Motor/Belt/Pulleys 7-6
- Ribbon Spindle Drive Motors/Belts/Pulleys 7-8
- Ribbon-Saver Drive Motor & Belt 7-10
- Ribbon Cassette Timing Belt & Rollers 7-11
- Ribbon Boss/Torque Limiter (Direct Load) 7-13
- Ribbon Boss/Torque Limiter (Cassette Load) 7-14
- Main Board 7-15
- Secondary Board 7-17
- Flash Memory Board 7-18
- Power Board 7-19
- Panel & LCD Board 7-20
- Interface Board 7-22
- Label Sensor 7-23
- Head-Open Sensor 7-26
- Ribbon Sensor 7-28
- Ribbon-End Sensor (Direct Load) 7-29
- Ribbon-End Sensor (Cassette Load) 7-31
- Ribbon-Saver Sensor 7-32
- Cover-Open Switch (Direct Load) 7-33
- Fuse 7-34
- Fan 7-35
- Fan Filter 7-36

ADJUSTMENT PROCEDURES

Adjustment Procedures
- Label Sensor Positioning 8-2
- Print Head Pressure 8-3
- Print Head Alignmnent 8-4
- Ribbon Guide Alignment 8-5
- Media Pressure Roller Balance 8-6
- Printer Belt Tensioning 8-7
- Ribbon Cassette Belt Tensioning 8-8
- Print Head Balance 8-9
- Print Head DPI Change 8-10
- Eye-Mark/Paper-End Sensor Sensitivity 8-12
- Gap Sensor Sensitivity 8-13
- Operational Adjustments 8-14
  - Pitch 8-14
  - Offset 8-14
  - Darkness 8-14

APPENDIX

Cover Removal Diagram 9-2
Block Diagram 9-3
Print Setup Dimensions 9-4
Label Reference Position 9-5
Label Adjustment Diagram 9-6
Printer Connection Diagram 9-7
Printer Loading Diagram 9-8
Typical Applicator Process 9-10
Printer Packing & Unpacking Diagram 9-11
Ready/Busy Timing Charts 9-12
X-On/X-Off Timing Charts 9-13
Session Connect/Disconnect Diagram 9-14
Printer Mounting Diagram 9-15
Printer Dimensions (Standard w/Cassette) 9-16
Printer Dimensions (Opposite w/Cassette) 9-19
Printer Dimensions (Standard Direct Load) 9-22
Printer Dimensions (Opposite Direct Load) 9-25
Glossary 9-28

1

INTRODUCTION

- **About This Manual**
- **General Description**
- **Theory Of Operation**
- **Control Features**

ABOUT THIS MANUAL

This manual is laid out consistent with the product discussed and provides all of the information required for printer maintenance and repair by SATO approved personnel. For the repair technician, this manual is intended to compliment, and to be used as an extension of, owner/operator literature.

This manual also incorporates the use of special information boxes. Examples of these boxes and the type of information provided in each, are below.

WARNING: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN PERSONAL INJURY.

CAUTION: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN EQUIPMENT DAMAGE.

ATTENTION: Provides information that is deemed of special importance but will not result in personal injury or product damage if unheeded.

NOTE: Provides helpful hints to assist in performing the tasks at hand.

LCD DISPLAY: Provides the specific display that should be visible on the LCD at that point.

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different Units, Chapters, and some Sections. Each references the page number of their commencement.

The pages of this manual have embedded headers and footers to assist the user in identifying his or her exact position within the manual. The header provides the unit number followed by its name. The footer identifies the product on the left, the page number in the center, and the manual's part number to the right side of the page.

Page enumeration is two-part with each separated by a hyphen. The first character set references the Unit and the second identifies the page number within that unit. Page numbers begin with the numeral one (1) at the beginning of a new unit and ascend sequentially.

ATTENTION: The illustrations and graphics provided in this manual may display components, assemblies, and purchase options that may not be present on idividual printers. However, where those instances arise, they are not revalent to the topic discussed.

GENERAL DESCRIPTION

The S8400 series print engines are specifically designed for use in high-volume, automated print/apply labeling applications demanding unparalleled reliability and around the clock operation. These print engines offer four-inch wide printing ability and are available in 203, 305, and 609 dpi print resolution. However, more compelling is their user-friendly design and application flexability.

These OEM print engines follow the design concepts and principles of SATO's previous, market leading, industrial print engines. The S8400 series can physically and electronically replace any of SATO's previous S-type OEM print engines. Additionally, this printer utilizes the same SATO Barcode Printing Language (SBPL) as drives all current SATO OEM print engines.

The S8400 series print engine is available with many options, including quick-change ribbon cassette, ribbon saver, and RFID capability.

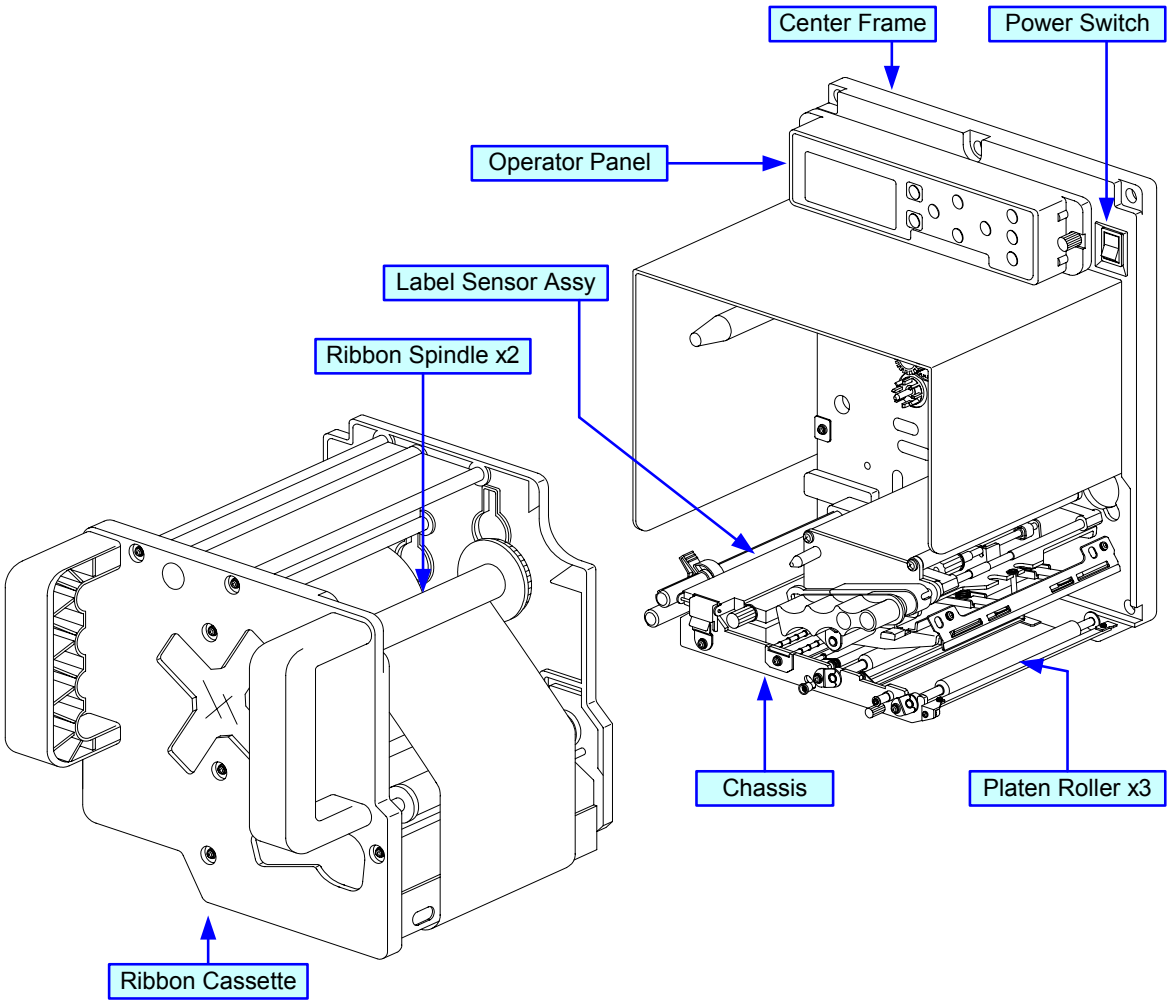


Figure 1-1a, Primary Components

THEORY OF OPERATION

When activated, media is fed past the print head by an integrated drive train. The drive train is electric, stepper motor driven and coupled to a gear, pulley, and belt configuration located on the electrical side of the printer's center frame. A pulley is concentrically attached to the motor spindle and provides differential torque to a series of pulleys via three timing belts. These pulleys, with gears concentrically attached, provide movement to the three platen roller spindles and provide media movement through treading contact with the roller.

Two separate stepper motors, transfer torque to the ribbon supply and ribbon rewind spindles by way of a belt designated for each, and engaged on the opposite end, a pulley for each spindle. The pulleys located on the printer's electrical side, are directly attached to gears on the print side. When the ribbon spindles' gears are engaged with their respective pulley/gear combo, a separate gear, pulley, and belt configuration tranfers torque from the ribbon rewind spindles to ribbon rollers via a single timing belt located on the printer's print side. The ribbon rewind spindle rotates on axis while maintaining its projectory to takeup and rewind used ribbon.

To facilitate removal of the used ribbon material, it is wound onto a cardboard sleeve referred to as a core. The core is inserted onto the spindle's boss and rotates in unison. When rewinding is complete, the core is removed along with the used ribbon material and a replacement core is inserted in its place.

For ribbon loading, there are two methods available as purchase options; direct loaded or cassette loaded. Direct loaded ribbon spindles are hard-mounted to the printer and may not be removed except for service. The cassette loaded feature permits ribbon stock to be loaded onto spindles that are detachable from the cassette. The cassette is inserted into the printer's print side so that its spindles may engage with respective gears mentioned in paragraph 2. The cassette loaded feature permits multiple other cassettes to be loaded and maintained on standby for printer insertion and use when the exisiting supply is exhausted, thusly, reducing down-time.

As a purchase option, a ribbon-saver feature may be installed for applications requiring a small amount of thermal transfer print on an otherwise pre-printed label. Without the ribbon-saver feature, ribbon would be exhausted during the entire length of the label as it is fed through the printer; even if printing is not ocurring. The ribbon-saver feature allows the ribbon to remain stationary during areas where printing is not demanded while the media continues to advance. Through a stepper motor designated for the ribbon-saver feature, torque is transfered by way of a belt and pulley configuration. A sensor engaged with a toothed disc plate monitors and controls movement while a dampening lever is actuated by the same assembly to control print head vertical movement.

Paper guides within the chassis assembly ensure the media remains properly positioned beneath the print assembly and is fed unimpeded from the printer's rear through to the front.

A series of strategically located sensors and switches send signals to the processing unit. Some sensors are two part consisting of transmitting and receiving components. The transmitting component is mounted opposite of the receiving component so that media may pass between the two. When present, the media blocks sensor transmission from reaching the receiver. The processing unit in turn sends response signals to the various features based on programmed and received data. These signals, are the controlling force of mechanical activities.

The print head, through thermal heat, inductively provided by electrical supply, transfers print images onto the media as it passes. The print image may be manifested through either a direct process initiated through a chemical reaction to the heat from within the label media or transferred from the ink coated ribbon stock.

Predetermined voltage supply of alternating current, from an independent souce, is required for proper function. The printer's integrated power panel transforms the supplied voltage to direct current which is mediated to the various circuitry. This circuitry is comprised of properly positioned transformers, relays, diodes, resistors, and chips which sends, receives, and processes communication data throughout the system.

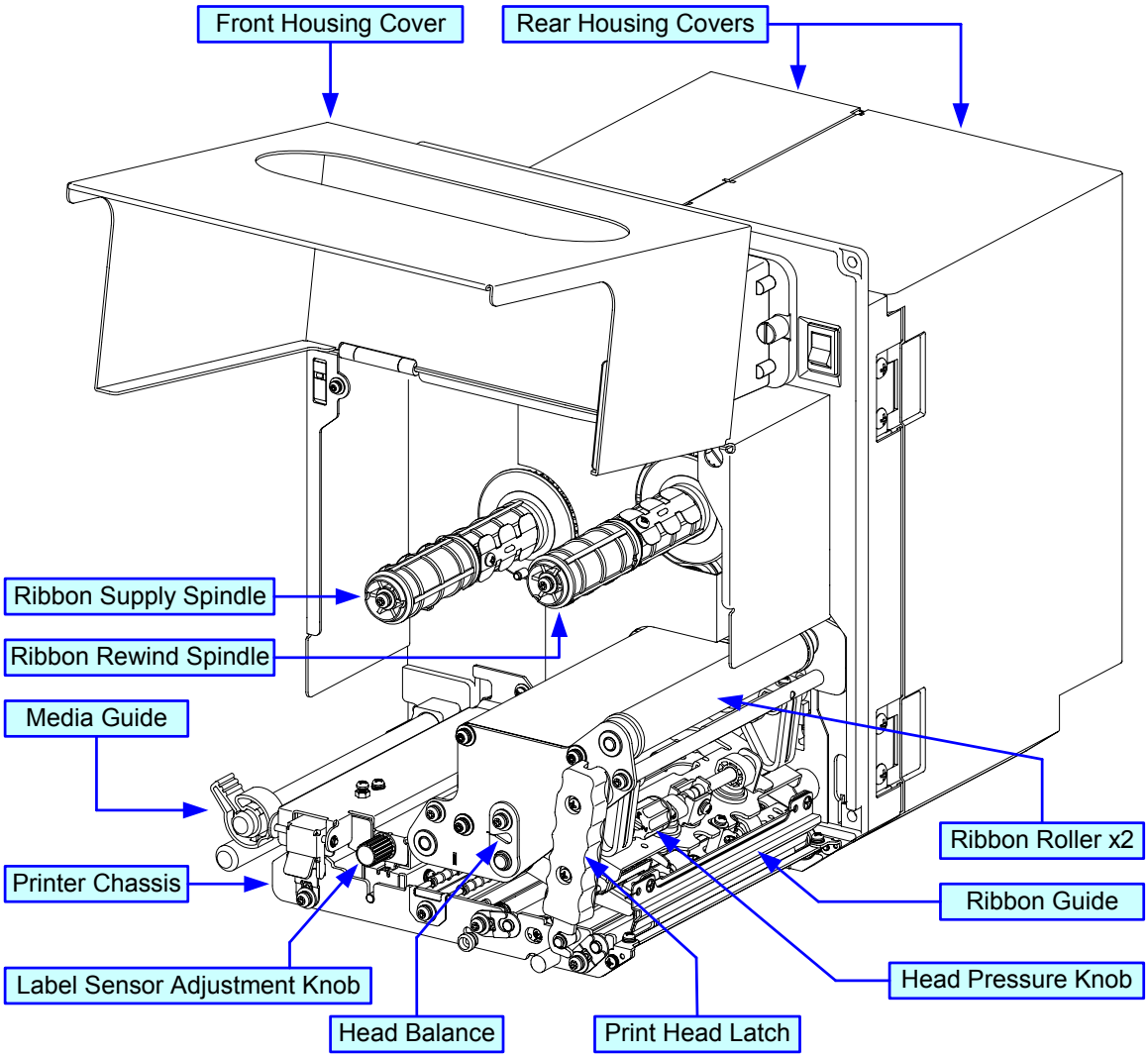


Figure 1-1b, Primary Components

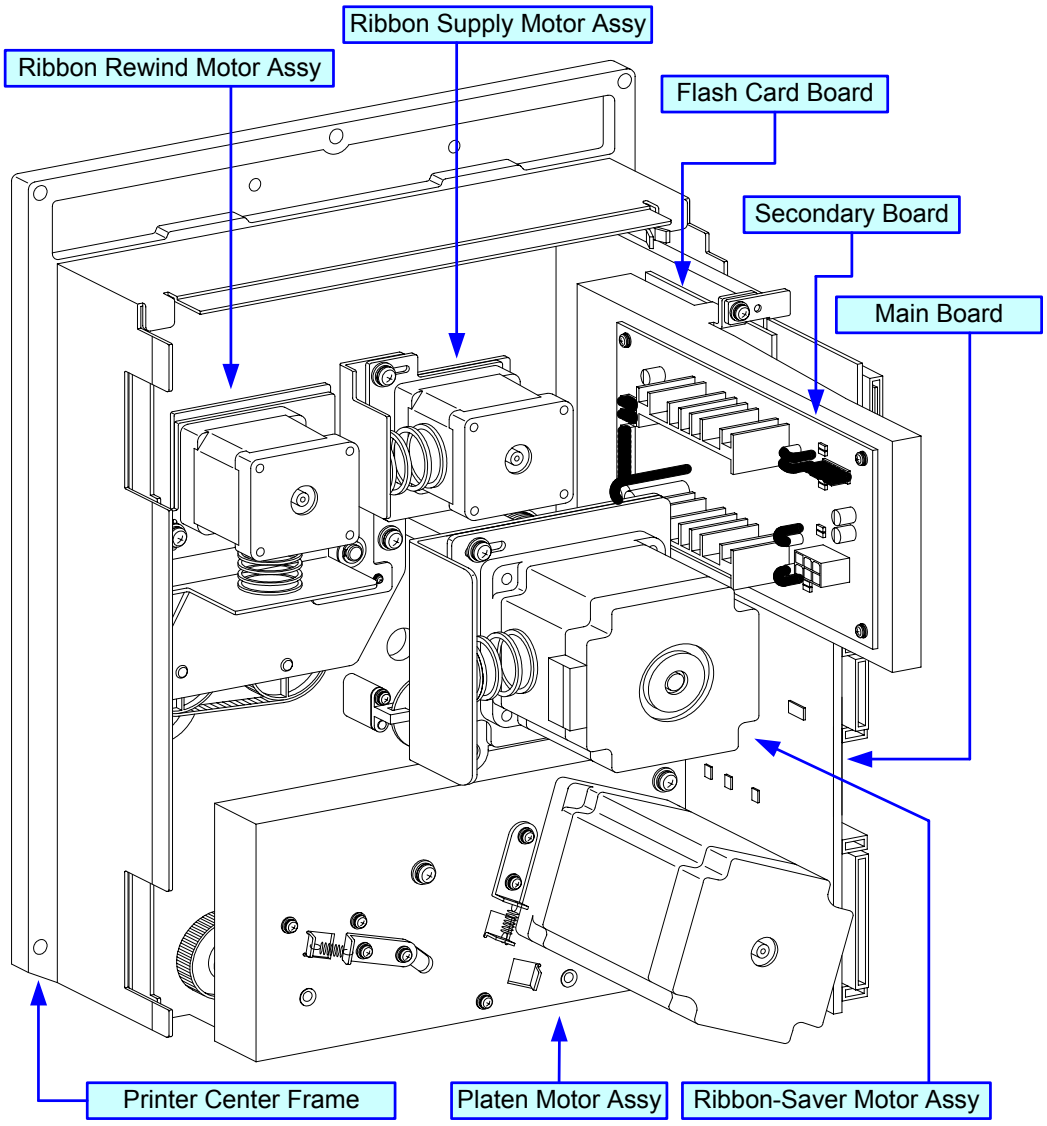


Figure 1-1c, Primary Components

CONTROL FEATURES

This chapter identifies the interactive control features of the printer. These functions are defined generally here. More specific explanations will be found throughout this manual on how to use them.

OPERATOR PANEL FEATURES	
LED	**DEFINITION**
POWER	Illuminates green when the printer is powered on. Terminates when powered off.
ONLINE	Illuminates green when the printer is in an online state. Terminates when the printer goes offline.
LABEL	Off = Normal state. Red Constant = When a Label Error has occurred.
RIBBON	Off = Normal state. Red Flashing = Ribbon supply is low. Red Constant = When a Ribbon Error has occurred.
KEYS	**DEFINITION**
POWER	Removes power supply at its entry to the printer.
LINE	Moves the printer from an online to offline state and vise-versa. Has other special functions as identified in flow charts throughout this manual as applicable.
FEED	Advances the label media when pressed. Has other special functions as identified in flow charts throughout this manual as applicable.
FUNCTION	Pressing steps the LCD back to a previous menu. Has other special functions as identified in flow charts throughout this manual as applicable.
ENTER	Used to select a menu option and to advance the menu screen accordingly. Has other special functions as identified in flow charts throughout this manual as applicable.
CANCEL	Pressing steps the LCD back to a previous menu. Has other special functions as identified in flow charts throughout this manual as applicable.
ARROWS	Allows the operator to scroll through various menus and menu options. Has other special functions as identified in flow charts throughout this manual as applicable.
POTENTIOMETERS	**DEFINITION**
VOLUME	Allows volume control of the printer's audible alarm.
PITCH	For adjusting the print position.
OFFSET	Adjusts the peel or dispense stop position.
DARKNESS	Adjusts the print density resulting in a lighter or darker print image.

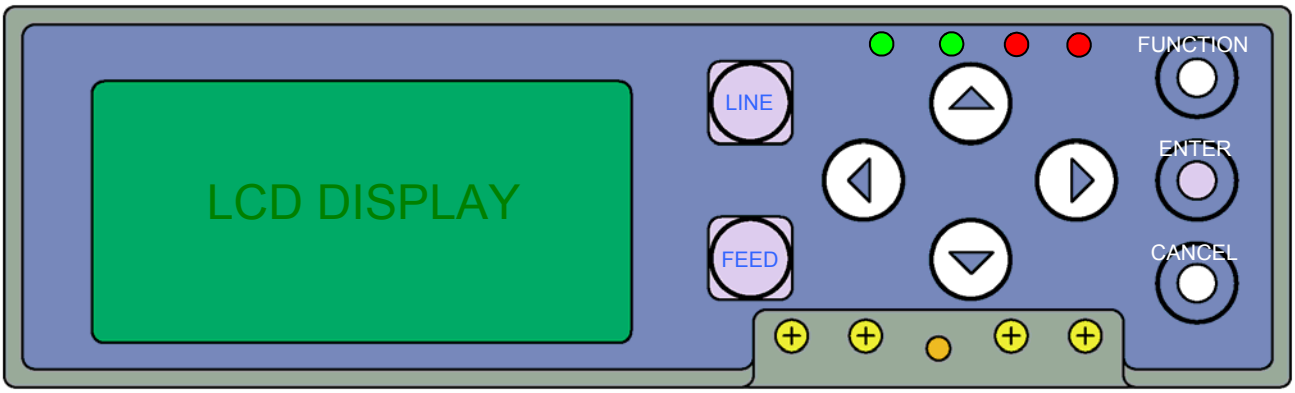


Figure 1-2, Operator Panel

2

TECHNICAL DATA

- Physical Characteristics
- Power
- Environmental
- Processing
- Command
- Interface Modules
- Regulatory Approvals
- Print
- Media
- Ribbon
- Sensing
- Character Font Capabilities
- Barcode Capabilities

PHYSICAL CHARACTERISTICS	
Typical Width	9.65 Inches (245mm)
Typical Height	11.81 Inches (300mm)
Maximum Depth	18.82 Inches (478mm)
Standard Weight	35.27 Pounds (16.0Kg)

POWER	
Input Voltage	100-240 Volts AC +/- 10%, 50/60 Hertz +/-5%
Power Consumption	220 Watts, 2.7 to 1.1 Amperes (operating)
Accelleration Perfomance	3.5G (Frequency: 10Hz or below, Vibration Time: within 5 minutes)

ENVIRONMENTAL	
Operating Temperature	41 to 104°F (5° to 40°C)
Storage Temperature	0 to 140°F (-20° to 60°C)
Storage Humidity	15 to 85% RH Non-Condensing
Operating Humidity	15 to 85% RH Non-Condensing

PROCESSING	
CPU	32 Bit RISC
FLash ROM	4 Megabytes
SDRAM	16 Megabytes
FRAM	32 Kilobytes
Receive Buffer	2.95 Megabytes
SRAM (integrated calendar)	8 Kilobytes

COMMAND	
Standard	SATO Barcode Printer Language (SBPL)

INTERFACE MODULES	
Enhanced Parallel Port	IEEE1284 (ECP Compatible)
Serial Port	RS232C (9600 to 57,600 bps) - 25 Pin RS422/485 (9600 to 57600 bps) RS232C - 9 Pin PCI
Universal Serial Bus (USB)	USB Adapter (12 Mbps) - PCI
Local Area Network (LAN)	10BASE-T/100BASE-TX Automatic Switching
Wireless LAN	802.11g Wireless

REGULATORY	
Safety	MET, NEMKO-GS, C-MET
Radiant Noise	FCC (Class B), EN 55022 (Class B)
Efficiency	International Energy Star
Packaging Drop Test	ISTA-2A

PRINT	
Method	Direct Thermal / Thermal Transfer
Head Width	4.09 Inches (104mm)
Maximum Speed	203 Dots Per Inch (8dpmm): 4 to 16 Inches Per Second (102-406mm/s) 305 Dots Per Inch (12dpmm): 4 to 14 Inches Per Second (102-356mm/s) 609 Dots Per Inch (24dpmm): 2 to 6 Inches Per Second (51-152mm/s)
Resolution	203 Dots Per Inch (8dpmm) 305 Dots Per Inch (12dpmm) 609 Dots Per Inch (24dpmm)
Maximum Printable Area	203 Dots Per Inch (8dpmm): 4.09 x 98.4 Inches Wide (104mm W x 2500mm L) 305 Dots Pre Inch (12dpmm): 4.09 x 59.0 Inches Wide (104mm W x 1500mm L) 609 Dots Per Inch (24dpmm): 4.09 x 15.7 Inches Wide (104mm W x 400mm L)

MEDIA			
Width	Media Width: 0.394 to 5.039 Inches (10-128 mm) Media Width with Backing Paper: 0.5 to 5.1 Inches (13-131 mm)		
Length (Pitch)	Media Length: 0.6 Inches (15 mm) (to printable area)		
Type	Die-Cut Labels, Waste removed, Roll, 0.125 inch Gap or Eye-Mark		
Thickness	0.002 to 0.012 Inches (0.05 - 0.31mm)		
Media Handling	Media Width (mm)	Label Supply Load (grams)	Liner Rewind Load (grams)
	13 to 18	< 250	< 150
	18 to 28	< 400	< 300
	28 to 48	< 900	< 300
	48 to 63	< 1,200	< 400
	63 to 83	< 1,200	< 650
	83 +	< 1,400	< 800

RIBBON			
Width	Minimum: 0.98 Inches (25mm) Maximum: 5.04 Inches (128mm)		
Length	3280 Feet (1000m)		
Ribbon Handling	Ribbon Length (m)	Ribbon Width (mm)	Label Pitch (mm)
	1,000	76	60 +
	600	39.5 to 75	25 +
	450	< 39.5	< 25
Wound	Face In / Face Out		
Roll Diameter	4.252 Inches (108mm)		
Core Diameter	1.01 +/-0.008 Inches (25.6mm +/-0.2mm)		
Color	Black (standard), Other Tints (non-standard)		

SENSING	
Gap	Adjustable
Reflective Eye-Mark	Adjustable
Ribbon Near End	Enable/Disable
Media Out	Constant
Cover-Open	Constant
Head-Open	Constant

CHARACTER FONT CAPABILITIES	
MATRIX FONTS	
XU	5 dots W x 9 dots H (Helvetica)
XS	17 dots W x 17 dots H (Univers Condensed Bold)
XM	24 dots W x 24 dots H (Univers Condensed Bold)
OA Font (OCR-A)	203dpi (8dots/mm): 15 dots W x 22 dots H 305dpi (12dots/mm): 22 dots W x 33 dots H 609dpi (24dots/mm): 44 dots W x 66 dots H
OB Font (OCR-B)	203dpi (8dots/mm): 20 dots W x 24 dots H 305dpi (12dots/mm): 30 dots W x 36 dots H 609dpi (24dots/mm): 60 dots W x 72 dots H
AUTO SMOOTHING FONTS	
XB	48 dots W x 48 dots H (Univers Condensed Bold)
XL	48 dots W x 48 dots H (Sans Serif)
VECTOR FONT	
	Proportional or Fixed Spacing Font Size 50 x 50 dots to 999 x 999 dots Helvetica, 10 Font Variations
AGFA RASTER FONTS	
A Font	CG Times, 2 to 99 pt. (4-999 dots)
B Font	CG Triumvirate, 2 to 99 pt. (4-999 dots)
DOWNLOADABLE FONTS	
	Compact Flash Card required
CHARACTER CONTROL	
	Expansion up to 12 x in either the X or Y coordinates. Character Pitch Control Line Space Control Journal Print Facility 0, 90, 180, and 270 Degree Rotation

BAR CODE CAPABILTIES	
Linear Bar Codes	UPC A/E EAN 8/13 Code 39 Code 93 Code 128 Interleaved 2 of 5 Industrial 2 of 5 Matrix 2 of 5 Bookland RSS-14 MSI POSTNET UCC/EAN 128 NW-7 (Codabar)
Two Dimemsional	QR Code Data Matrix (ECC200) Maxi Code PDF417 Composite Symbology
Bar Width Ratio	1:2, 1:3, 2:5, User definable bar widths
Bar Height	4 to 999 dots, User progammable
Rotation	0, 90, 180, and 270 Degrees
Sequential Numbering	Sequential numbering of both numerics and bar codes
Graphics	Full dot addressable graphics, SATO Hex/Binary, BMP or PCX formats
Form Overlay	Form overlay for high-speed editing of complex formats

3

INTERFACE SPECIFICATIONS

- **RS232C High-Speed Serial Interface**
- **IEEE1284 Parallel Interface**
- **Universal Serial Bus (USB) Adapter**
- **Local Area Network (LAN) Ethernet**
- **802.11g Wireless**
- **Receive Buffer (all interfaces)**
- **ACK/NAK Protocol (all interfaces)**
- **Status5 Return (all interfaces)**
- **External Signal Interface**

INTERFACE SPECIFICATIONS

This unit presents the printer interface types and their specifications. These specifications include detailed information to assist in the selection of the most appropriate method for the printer to interface with the host. The five acceptable interface methods are:

- RS232C High-Speed Serial
- IEEE1284 Parallel
- Universal Serial Bus (USB)
- Local Area network (LAN) Ethernet
- 802.11g Wireless

Following the selection of the desired interface, proceed to the next unit for instructions on how to configure the printer for that interface type.

WARNING: NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE HOST OR THE PRINTER. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY IN THE PRINTER/HOST AND IS NOT COVERED BY WARRANTY.

NOTE: Some hosts monitor the Request-To-Send (RTS) signal (pin 4 of 25) to determine if the printer is ready to receive data. Since the printer does not generate this signal, the RTS line must be held true (high) in order to allow communication. This can be performed by connecting the RTS pin to the Clear-To-Send (CTS) signal (pin 5 of 25).

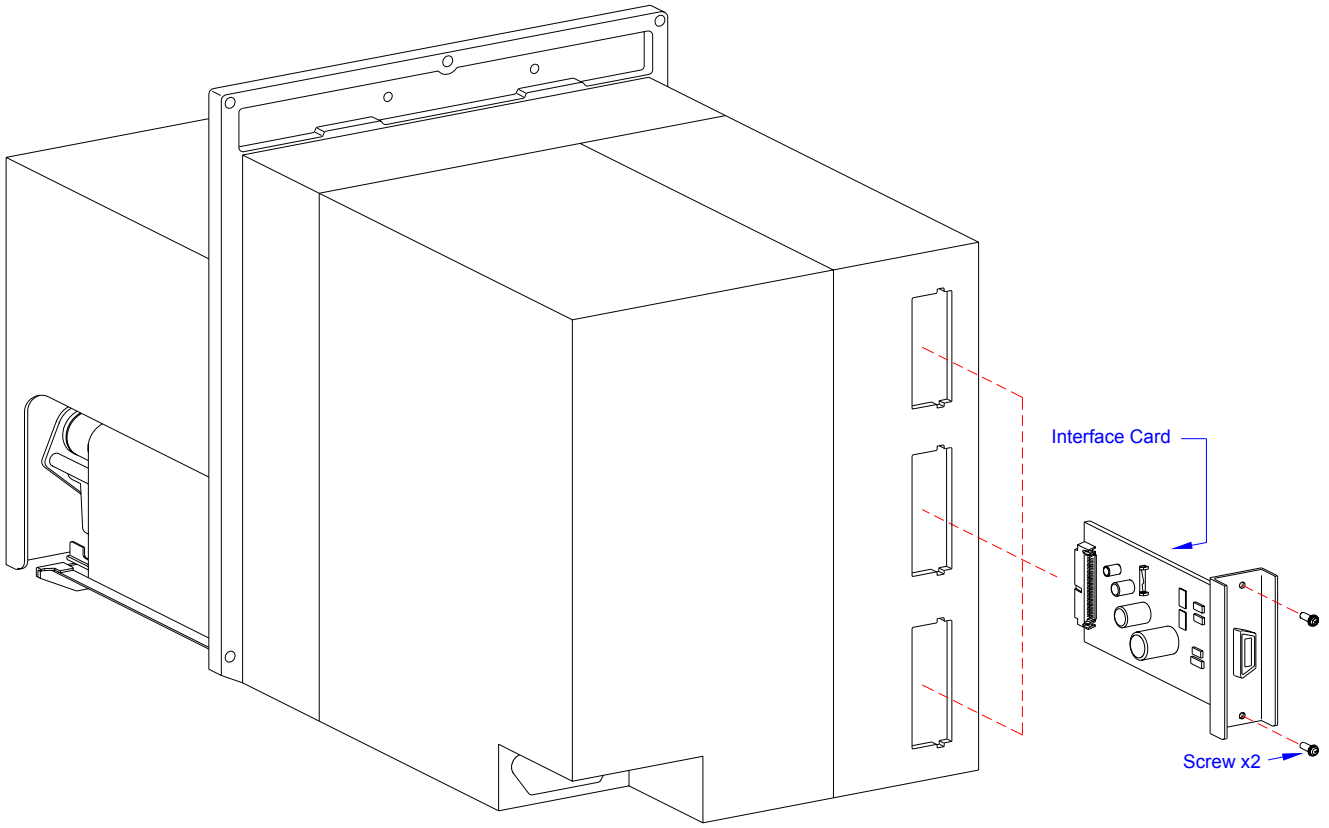


Figure 3-1, Interface Installation

RS232C HIGH-SPEED SERIAL INTERFACE

This High Speed Serial Interface is a Plug-In Interface Module that can be installed in the printer by the user.

INTERFACE SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication Bi-Directional Communication
Data Transmission Rate	9600, 19200, 38400, 57600 bps
Transmission Form	Start, b1, b2, b3, b4, b5, b6, b7, b8, Stop (b8 will be omitted if using 7 bit oriented)
Data Length	7 or 8 bit (selectable)
Stop Bit	1 or 2 bit (selectable)
Parity Bit	ODD, EVEN, NONE (selectable)
Codes Used	ASC II Character Codes: 7 bits, Graphics: 8 bits
Control Codes	STX (02H), ETX (03H), ACK (06H), NAK (15H)
Connector (Printer Side)	DB-25S Male (equivalent), 9-pin Serial Interface (PCI)
Cable Connector	DB-25P Female (equivalent), 9-pin Serial Interface (PCI)
Cable Length	5 meters or less.
Signal Levels	High = +5V to +12V, Low = -5V to -12V
Protocol	Ready/Busy, X-On/X-Off, Protocol for Driver, Status4, Status5

DIPSWITCH SETTINGS				
SWITCH	**COMPONENT**	**SETTINGS**		
1	Data Bit	ON		7 Bits
		OFF		8 Bits
2 & 3	Parity	**2**	**3**	
		ON	ON	Reserved
		ON	OFF	ODD
		OFF	ON	EVEN
		OFF	OFF	NONE
4	Stop Bit	ON		2 Bits
		OFF		1 Bit
5 & 6	Baud Rate	**5**	**6**	
		ON	ON	57600 bps
		ON	OFF	38400 bps
		OFF	ON	19200 bps
		OFF	OFF	9600 bps
7 & 8	Protocol	**7**	**8**	
		ON	ON	Reserved: Status2 & 3 (when compatible mode is OFF)
		ON	OFF	Protocol for Driver, Status5
		OFF	ON	X-ON/X-OFF
		OFF	OFF	Ready/Busy

READY/BUSY INTERFACE SIGNALS		
PIN	**DIRECTION**	**SIGNAL DEFINITION**
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/X-Off characters or status data (bi-directional protocols).
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	To Host	RTS (Request to Send) - Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open (in this case, RTS would return to the high state after the print head is closed and the printer is placed back on-line) or an error condition occurs during printing (e.g., ribbon out, label out).
5	To Printer	CTS (Clear to Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when this line is low. If this line is not being used, it should be tied high (to pin 4).
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 20).
7	Reference	SG (Signal Ground)
20	To Host	DTR (Data Terminally Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is off-line, either manually or due to an error condition, and while printing in the single job buffer mode. It will also go low when the data in the buffer reaches the buffer near full level.

READY/BUSY CABLE REQUIREMENTS					
DB9	**DB25**	**HOST**	**DIRECTION**	**DB25**	**PRINTER**
1	1	FG (Frame Ground)	Bi-Directional	1	FG (Frame Ground)
2	3	RD (Receive Data)	To Host	2	TD (Transmit Data)
3	2	TD (Transmit Data)	To Printer	3	RD (Receive Data)
8	5	CTS (Clear To Send)	To Printer DB9-6	4	RTS (Request To Send)
4	20	DTR (Data Terminal Ready)	To Printer DB9-4	5	DSR (Data Set Ready)
6	6	DSR* (Data Set Ready)	To Host	6	DTR (Data Terminal Ready)
5	7	SG (Signal Ground)	Bi-Directional	7	SG (Signal Ground)
** This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically, on a PC, it would be either CTS (pin5) or DSR (pin 6) on a DB-25 connector.*					

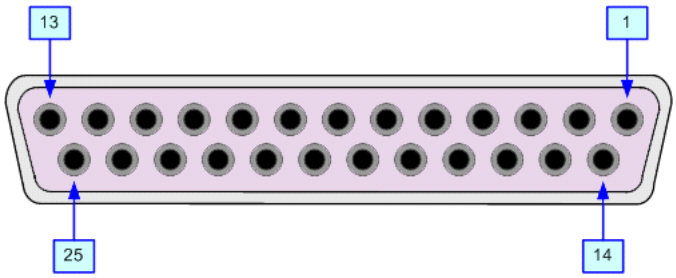


Figure 3-2, Serial Connector Pin Assignments

X-ON/X-OFF CABLE REQUIREMENTS					
Communicates with the host to determine if the printer is ready to receive data by sending “XON” (HEX 11H) or “XOFF” (HEX 13H) code to the TD line. The single and multiple item buffers are switchable in the Interface Mode of the printer.					
DB9	**DB25**	**HOST**	**DIRECTION**	**DB25**	**PRINTER**
1	1	FG (Frame Ground)	Bi-Directional	1	FG (Frame Ground)
2	3	RD (Receive Data)	To Host	2	TD (Transmit Data)
3	2	TD (Transmit Data)	To Printer	3	RD (Receive Data)
5	7	SG (Signal Ground)	Bi-Directional	7	SG (Signal Ground)

NOTE: Depending on the host used, it may be required to loop CS and RS (maintaining at high-level) on the host side. For more information, refer to the host computer documentation.

NOTE: Refer to the Charts & Diagrams unit of this manual to view timing charts for Ready/Busy and X-ON/X-OFF.

IEEE1284 PARALLEL INTERFACE

The parallel interface is a plug-in module that can be installed by the user and conforms to IEEE1284 specifications. It automatically detects the IEEE1284 signals and operates in the high speed mode. If the IEEE1284 signals are not detected, it will operate in the slower standard Centronics mode. For this reason, an interface cable and host interface conforming to the IEEE1284 specification must be present to fully utilize the speed capabilities. This interface also operates bi-directionally and can report the status of the printer back to the host.

SPECIFICATIONS	
Printer Connector	AMP 57-40360 DDK (or equivalent)
Cable Connector	AMP 57-30360 DDK (or equivalent)
Cable	1.5 meter or less
Signal Level	High = +2.4V to +5.0V, Low = 0V to -0.4V
Data Stream	<ESC>A . . Job#1 . . <ESC>Z<ESC>A . . Job#n . . <ESC>Z

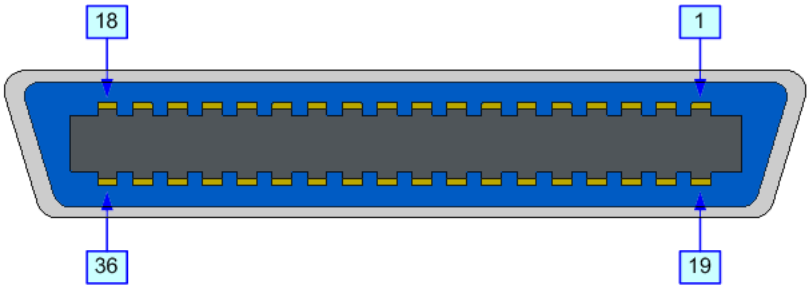


Figure 3-3, Parallel Connector Pin Assignments

PIN ASSIGNMENTS					
PIN	**SIGNAL**	**DIRECTION**	**PIN**	**SIGNAL**	**DIRECTION**
1	Strobe	To Printer	**19**	Strobe Return	Reference
2	Data 1	To Printer	**20**	Data 1 Return	Reference
3	Data 2	To Printer	**21**	Data 2 Return	Reference
4	Data 3	To Printer	**22**	Data 3 Return	Reference
5	Data 4	To Printer	**23**	Data 4 Return	Reference
6	Data 5	To Printer	**24**	Data 5 Return	Reference
7	Data 6	To Printer	**25**	Data 6 Return	Reference
8	Data 7	To Printer	**26**	Data 7 Return	Reference
9	Data 8	To Printer	**27**	Data 8 Return	Reference
10	ACK	To Host	**28**	ACK Return	Reference
11	Busy	To Host	**29**	Busy Return	Reference
12	Ptr Error	To Host	**30**	PE Return	Reference
13	Select	To Host	**31**	INIT	From Host
14	AutoFD1	To Host	**32**	Fault	To Host
15	Not Used		**33**	Not Used	
16	Logic Gnd		**34**	Not Used	
17	FG	Frame Gnd	**35**	Not Used	
18	+5V (z=24k ohm)	To Host	**36**	SelectIn1	From Host
1 *Signals required for ieee 1284 mode.*					

UNIVERSAL SERIAL BUS (USB)

The Universal Serial Bus (USB) interface is a Plug-In Interface Module that can be installed by the user. It requires a driver (shipped with each printer that has the interface installed) that must be loaded onto the PC and configured to support USB peripherals using Windows 2000 or above. Details for loading the USB driver are contained in the USB Interface Manual that is shipped with each printer with a USB Optional interface installed. Up to 127 devices may be connected to a USB port using powered hubs.

ATTENTION: This Interface Type Is Not Compatible With Windows 98 Or Windows Me.

SPECIFICATIONS	
Printer Connector	USB Type B Plug
Cable	10 feet (3 m) maximum
Host	Windows 2000 or above with USB Port
Power Supply	BUS Power through cable
Power Consumption	+5 V at 80 ma

LOCAL AREA NETWORK (LAN) ETHERNET

A Local Area Network (LAN) interface is an optional Plug-In Interface Module that can be installed by the user. It requires a driver shipped with each printer that has the interface installed. The driver that must be loaded onto the host computer and configured to run one of the supported network protocols using a 10Base-T or 100Base-TX LAN connection. Details for loading the LAN driver are contained in the LAN Interface Manual that is shipped with each printer with a LAN Optional interface installed.

SPECIFICATIONS	
Connector	RJ-45 Receptacle
Cable	10/100BaseT Category 5
Cable Length	100 meters or less
Power Supply	Powered from printer
Protocol	Status3 return Protocol for Driver (cyclic response mode) Protocol for Driver (ENQ response mode) Status5 return
IP Address	0.0.0.0 to 255.255.255.255
Subnet Mask	0.0.0.0 to 255.255.255.255
Gateway Address	0.0.0.0 to 255.255.255.255

DIPSWITCH SETTINGS	
SWITCH	**SETTING**
1	Reserved (setup prohibited).
2	LAN board EEPROM initialization (configuration).
3	Print configuration details on a label.
4	Print a self-diagmosis of the board onto a label.

SOFTWARE SPECIFICATIONS	
Corresponding Protocol	TCP/IP
Network Layer	ARP, RARP, IP, ICMP
Session Layer	TCP, UDP
Application Layer	LPD, FTP, TELNET, BOOTP, DHCP
NOTE: Print data can be sent by LPR and FTP of TCP/IP and dedicated socket protocol. Printer status is obtainable by dedicated socket protocol.	
NOTE: In the TCP/IP protocol enviroment, LPD and FTP are provided for printing; TELNET for variable setup; ARP, RARP, and BOOTP/DHCP for address setup.	
LPD protocol complies with RFC1179 and handles the list of logical printer name as queue name such as lp, sjis, euc. In addition, a banner page can be printed by a proper setup. *When sending the job by LPR, the transmission order of data file/control file within the job will not affect print operation. In addition, if the banner page is specified, it will be added to each data file. Job deletion by LPR is not available.*	
FTP protocol complies with RFC959 and handles the list of logical printer name as a transfer directory. File transfer to this directory executes print operation. It is possible to specify ASCII(A), Binary(I) and TENEX(L8) as transfer mode - although the mode difference is dependent on the client. A banner page may be printed with a proper setup.	
TELNET Complies with RFC854. This operation consists of interactive menu form and enables change and reference of internal setup, and to display status. To change the setup, enter "root" user and password at the time of login. Default of root pasword is set as null (linefeed only).	

802.11G WIRELESS

The wireless print server provides easy printer interface with 802.11g Wi-Fi compliant networks free of wired connections. Each printer is shipped with an integrated driver and interface installed. The driver must be loaded onto the host computer and configured to run one of the supported protocols.

SPECIFICATIONS	
Variable Data Rates	54, 11, 5.5, 2 and 1 Mbps
Frequency Band	2.4 GHz ISM Band
Wired Equivalent Privacy	128 bit, 64 bit (compatible with 40bit), none (WPA)
Sensitivity	(typ, AAWGN, 8E-2 PER): -91dBm at 1Mbps, -88dBm at 2 Mdps, -87dBm at 5.5Mbps, -84dBm at 11Mbps.
Range	100m indoors, 300m outdoors (enviromentally dependent)
Protocols	TCP/IP, IPX/SPX, Direct Mode IPX/IP, DLC/LLC, NetBEUI, NetBIOS/IP
Protocol	Status3 return Protocol for Driver (cyclic response mode) Protocol for Driver (ENQ response mode) Status5 return
IP Address	0.0.0.0 to 255.255.255.255
Subnet Mask	0.0.0.0 to 255.255.255.255
Gateway Address	0.0.0.0 to 255.255.255.255
Communication Mode	802.11 Ad hoc, Ad hoc, Infrastructure
SSID	Optional alphanumeric character string (up to 32 characters)
Channels	01 to 11

DIPSWITCH SETTINGS

The dipswitches serve to initialize the configuration saved on the Wireless-LAN board, print the configuration, and make a self-diagnosis. To communicate with the host,set the communication mode by through switches 5 and 6, then set the remaining switches to the OFF position.

Print of configuration and self-diagnsis are operable only on the screen after turning on the printer. Ensure all switches are in the OFF position when operating the printer.

SWITCH	SETTING	
1	OFF	Normal operating setting.
2	OFF	Normal operating setting.
	ON	Initialization/Reset to factory default upon power up.
3	OFF	Normal operating setting.
	ON	Configuration report upon power up - prints diagnostic report upon powering up.
4	OFF	Wireless Mode setting.
	ON	

NOTE: The communication mode may be set within the printer's Interface Mode. Go to [Communication] of the Interface Mode to enable setup by either the dipswitches or through the Interface Mode.

WIRELESS LAN SIGNAL STRENGTH			
Network Port	Link LED	Off	0 to 50% (weak)
		Blinking	50 to 75% (medium)
		On	75 to 100% (strong)

LED INDICATOR STATUS			
Link LED (green)	Network Port	Off	---
	Front Panel	Blinking	Waiting for link
		On	Linked
Status LED (orange)	Network Port	Off	---
	Front Panel	Blinking	Receiving packet
Wireless LED (green)	Front Panel	Blinking	Ad-hoc mode
		On	Infrastructure mode

SOFTWARE SPECIFICATIONS	
Corresponding Protocol	TCP/IP
Network Layer	ARP, RARP, IP, ICMP
Session Layer	TCP, UDP
Application Layer	LPD, FTP, TELNET, BOOTP, DHCP
NOTE: Print data can be sent by LPR and FTP of TCP/IP and dedicated socket protocol. Printer status is obtainable by dedicated socket protocol.	
NOTE: In the TCP/IP protocol enviroment, LPD and FTP are provided for printing; TELNET for variable setup; ARP, RARP, and BOOTP/DHCP for address setup.	
LPD protocol complies with RFC1179 and handles the list of logical printer name as queue name such as lp, sjis, euc. In addition, a banner page can be printed by a proper setup. When sending the job by LPR, the transmission order of data file/control file within the job will not affect print operation. In addition, if the banner page is specified, it will be added to each data file. Job deletion by LPR is not available.	
FTP protocol complies with RFC959 and handles the list of logical printer name as a transfer directory. File transfer to this directory executes print operation. It is possible to specify ASCII(A), Binary(I) and TENEX(L8) as transfer mode - although the mode difference is dependent on the client. A banner page may be printed with a proper setup.	
TELNET Complies with RFC854. This operation consists of interactive menu form and enables change and reference of internal setup, and to display status. To change the setup, enter “root” user and password at the time of login. Default of root pasword is set as null (linefeed only).	

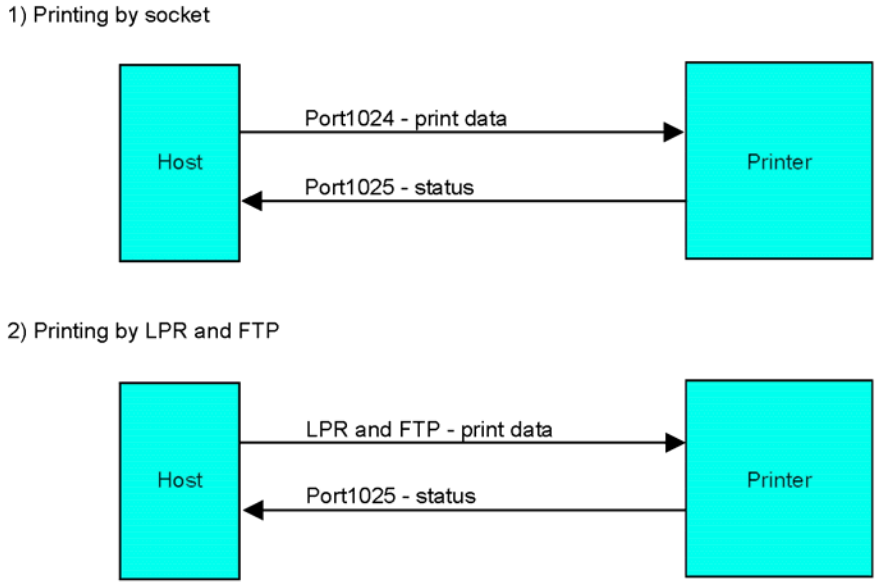


Figure 3-4, Socket Connection Diagram

ALL INTERFACES

RECEIVE BUFFER

The data stream is received from the host to the printer one job at a time. This allows the software program to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance. A multiple job buffer allows the printer to continuously receive print jobs while compiling and printing other jobs at the same time. It acts much like a Print buffer to maximize the performance of the host and the printer.

The printer receives and prints one job at a time. If a print job exceeds the buffer size, transmission will be rejected by the printer. Error conditions that occur during the Print Data transmission will cause the printer to return a NAK.

ACK/NAK PROTOCOL

Bi-Directional ACK/NAK protocol is used for error control. In a normal transmission sequence when the transmission is received, the printer will return an ACK (06H) signifying that it was received without a transmission error. After the transmission command structure has been analyzed, a status byte is returned to the host. This status byte informs the host of the validity of the command structure.
If the command structure is error free, the printer proceeds with the print operation. When the print operation is completed, a Printer Status message is returned to the host. If an error was detected during the initial transmission sequence, a NAK (15H) will be returned signalling to the host that the received transmission contained errors and must be resent. If the returned Status byte indicates a command structure error, the error must then be corrected before the print data is resent to the printer.
A valid transmission to the printer must be bounded by an STX/ETX pair, with the STX (02H) signifying the start of the Print Data and ending with an ETX (03H) signifying the end.

STATUS5 RETURN

This communication protocol is designed for the purpose of monitoring and controlling print data status in the host and featuring various functions.

INTERFACE SIGNALS		
PIN	**DIRECTION**	**SIGNAL DEFINITION**
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer.
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
7	Reference	SG (Signal Ground)

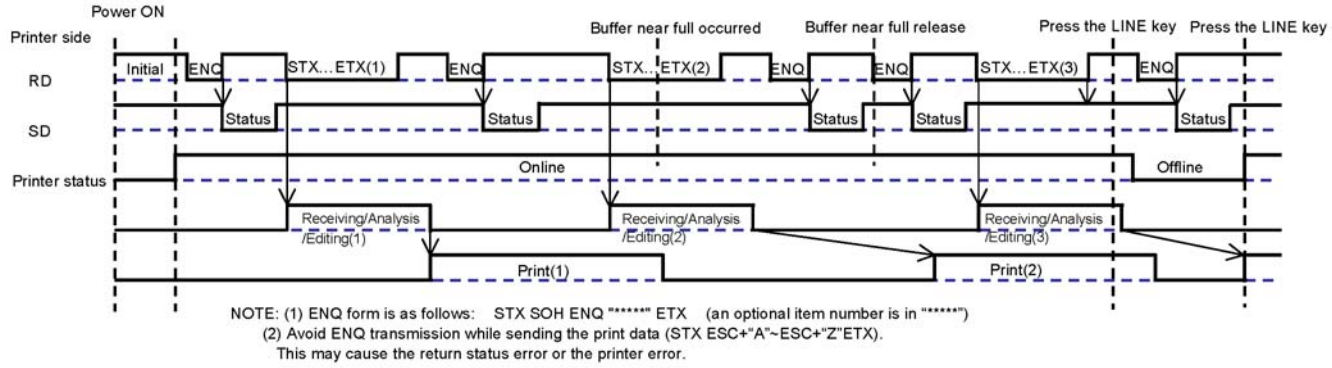
CABLE REQUIREMENTS					
Depending on the host used, it may need to loop CS and RS (maintaining at high level) on the hose side. For additional information, refer to the host computer documentation.					
DB9	**DB25**	**HOST**	**DIRECTION**	**DB25**	**PRINTER**
1	1	FG (Frame Ground)	Bi-Directional	1	FG (Frame Ground)
2	3	RD (Receive Data)	To Host	2	TD (Transmit Data)
3	2	TD (Transmit Data)	To Printer	3	RD (Receive Data)
5	7	SG (Signal Ground)	Bi-Directional	7	SG (Signal Ground)

RECEIVE BUFFER CONTROL	
Causes For Receive Buffer Near Full	Receive buffer near full occurs when the remaing free space of the buffer drops to 0.95MB of 2.95MB capacity or when the remaining free space is available for storing 50 of 500 items in the history buffer.
Release Of Receive Buffer Near Full	Receive buffer near full can be released when the remaining free space rises to 1.95MB or when the remaining free space is available for storing 200 items in the history buffer.

STATUS5 TIMING CHARTS

NORMAL PROCESS

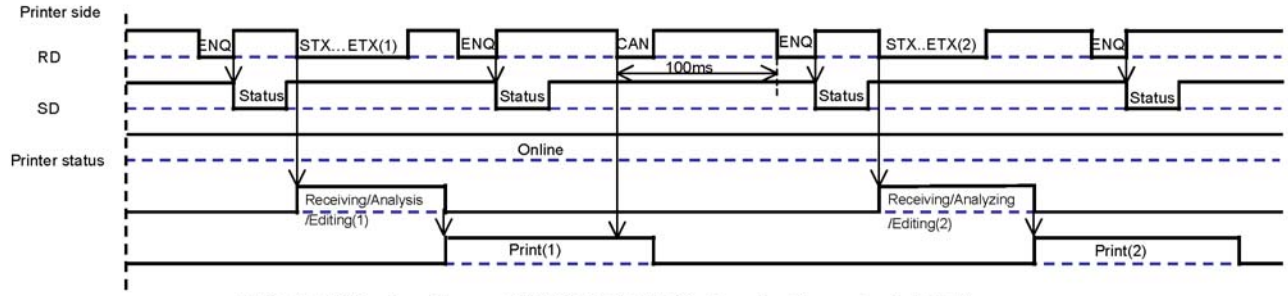
(Figure 3-5a)



NOTE: (1) ENQ form is as follows: STX SOH ENQ "******" ETX (an optional item number is in "******")
(2) Avoid ENQ transmission while sending the print data (STX ESC+"A"~ESC+"Z"ETX).
This may cause the return status error or the printer error.

CANCEL PROCESS

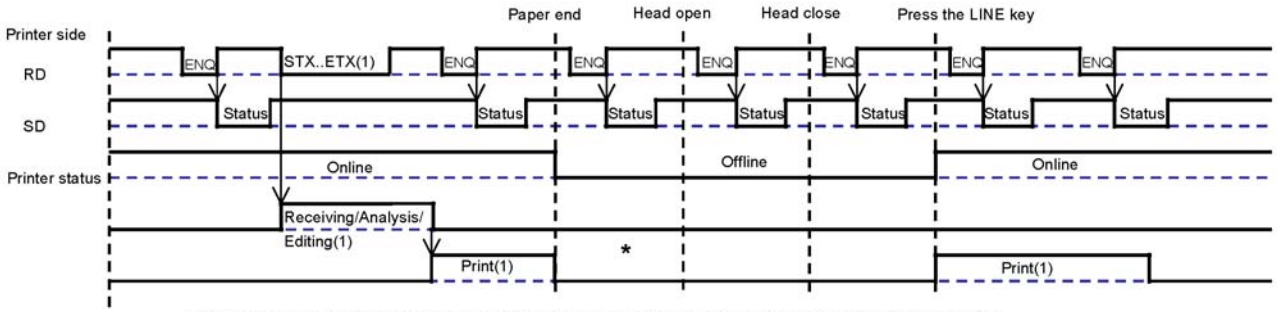
(Figure 3-5b)



NOTE: (1) CAN form is as follows: STX SOH CAN "******" ETX (an optional item number is in "******").
(2) To send the next data, wait approximately 100ms after sending CAN.

ERROR PROCESS

(Figure 3-5c)

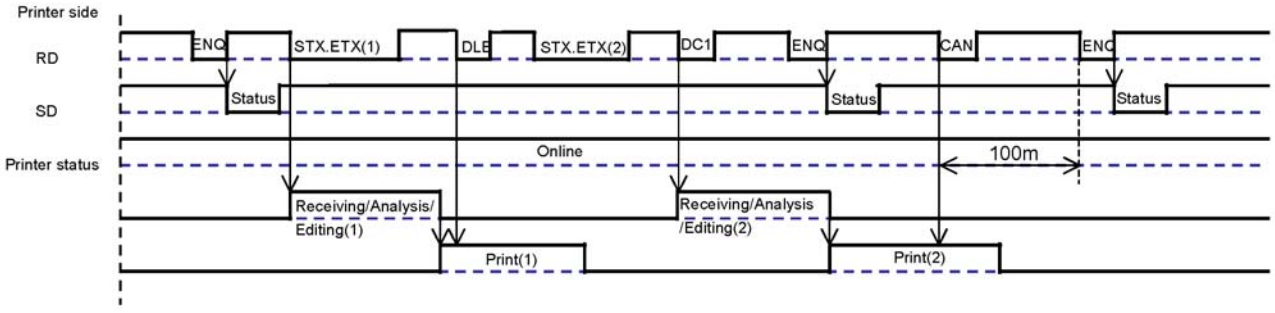


NOTE: (1) When the paper end has occurred, Open the head → Set the label → Close the head for feed operation.
(2) When the head is closed, the paper end will be released.

STATUS5 TIMING CHARTS

PRINT PROCESS

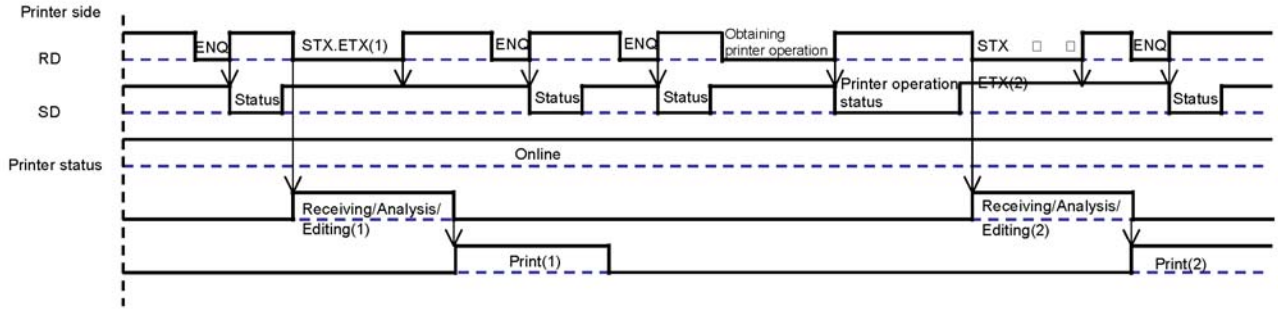
(Figure 3-5d)



NOTE: (1) DLE form: STX SOH DLE ETX
(2) DC1 form: STX SOH DC1 ETX

COMMAND PROCESS

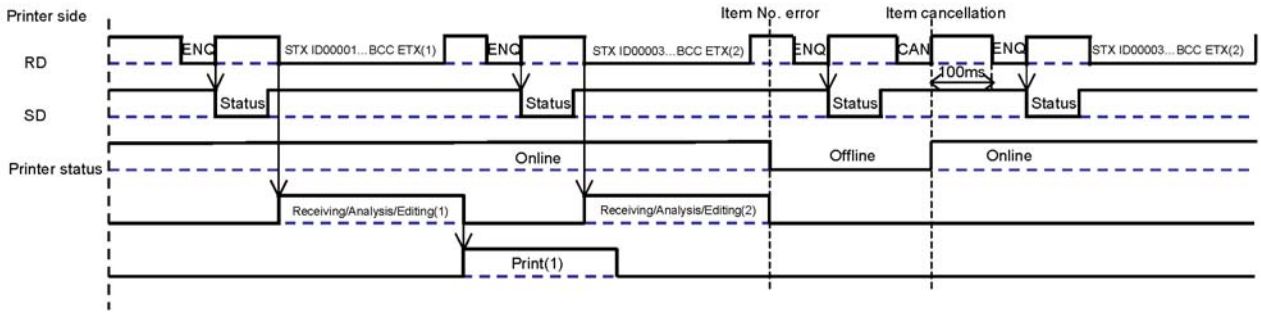
(Figure 3-5e)



NOTE: Avoid executing the command to obtain status (e.g. printer operation status) while printing.

BCC ERROR PROCESS

(Figure 3-5f)



NOTE : Avoid executing the command to obtain the status (e.g. printer operation status) while printing.

EXTERNAL SIGNAL

The external signal interface is designed to connect the printer to an applicator. Proceed to the printer's Advanced Mode for various setup activities related to the external signal.

There are two connector types available for the external signal interface, one with a 14-pin connector and the other with a 25-pin connector.

SPECIFICATIONS	
Signal Level	High: +2.4 to +5.0V, Low: +0.0 to +0.4V
Issuing/Reissuing EXT signal	Enable/Disable in the Advanced Mode.
Switching EXT signal	Switching jumper connector to enable +24V output by 24V and 27V power supplies. When using 24V power supply: Short IN 24V side by jumper connector When using 27V power supply: Short IN 27V side by jumper connector.
Signal Types	Type I Print end signal (PREND) is "low" before printing labels, "high" after completion of print, and "low" 20 miliseconds later. Type II Print end signal (PREND) is "high" before printing labels, "low" after completion of print, and "high" 20 miliseconds later. Type III Print end signal (PREND) is "low" before printing labels, "high" from start to end of print, and "low" upon completion of print. Type IV Print end signal (PREND) is "high" before printing labels, "low" from start to end of print, and "high" upon completion of print.

14-PIN CONNECTOR ASSIGNMENTS				
PIN	**SIGNAL NAME**	**DIRECTION**	**LEVEL**	**MAX CURRENT**
1	Paper End	Output	Low	5V, 400mA
2	Ground	--	--	--
3	Ribbon End	Output	High	5V, 400mA
4	Machine Error	Output	Low	5V, 400mA
5	Print Start (PRIN)	Input	Low	High: high impedance, Low: -15mAor more, 0V
6	Print End (PREND)	Output	Low	5V, 400mA
7	Reprint (PRIN2)	Input	Low	High: high impedance, Low: -15mAor more, 0V
8	EXT5V_IN	Input		5V
9	Online	Output	Low	5V, 400mA
10	Ribbon Near End	Output	Low	5V, 400mA
11	--	--	--	--
12	+24V	--	--	--
13	+5V	--	--	--
14	FG	--	--	--
Choose from Type I to Type IV for PREND (the output signal for Pin 6).				

25-PIN CONNECTOR ASSIGNMENTS				
PIN	**SIGNAL NAME**	**DIRECTION**	**LEVEL**	**MAX CURRENT**
1	Frame Ground	---	---	---
2	+5V	---	---	---
3	---	---	---	---
4	Machine Error	Output	Low	5V, 400mA
5	Print End (PREND)	Output	Low	5V, 400mA
6	Online	Output	Low	5V, 400mA
7	---	---	---	---
8	Reprint (PRIN2)	Input	Low	High: high impedance, Low: -15mA or more, 0V
9	---	---	---	---
10	---	---	---	---
11	EXT_GND	---	---	---
12	+5V	---	---	---
13	+24V	---	---	---
14	GND	---	---	---
15	EXT_GND	---	---	---
16	Ribbon End	Output	High	5V, 400mA
17	Paper End	Output	Low	5V, 400mA
18	Ribbon Near End	Output	High	5V, 400mA
19	---		---	---
20	Print Start (PRIN)	Input	Low	High: high impedance, Low: -15mA or more, 0V
21	---	---	---	---
22	---	---	---	---
23	---	---	---	---
24	EXT5V_IN	Input	---	5V
25	GND	---	---	---
Choose from Type I to Type IV for PREND (the output signal for Pin 5). PREND will not be output when the command is "0" in the cutter mode.				
Connect EXT_GND (Pins 11, 15) to external equipment GND.				
Supply EXT5V_IN (Pin 24) 5V from the external power supply.				

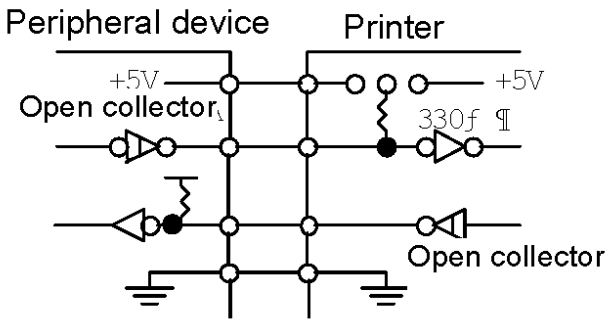


Figure 3-6, Input/Output Circuit Diagram

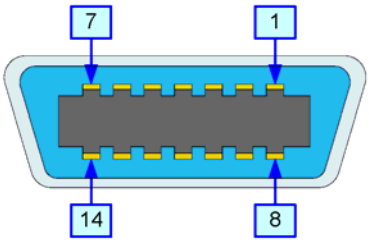


Figure 3-7, 14-Pin Connector Assignments

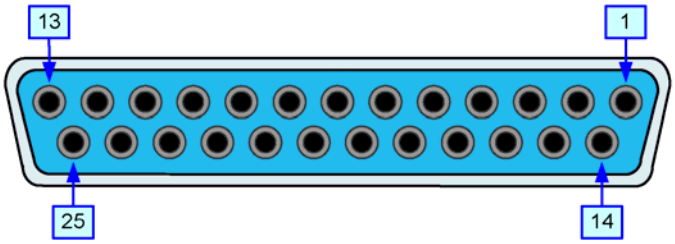
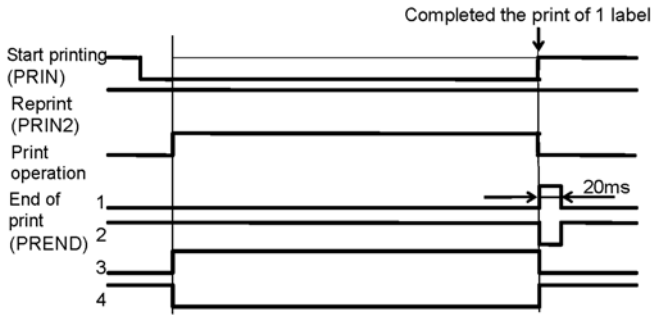


Figure 3-8, 25-Pin Connector Assignments

INPUT SIGNAL WAVE FORM

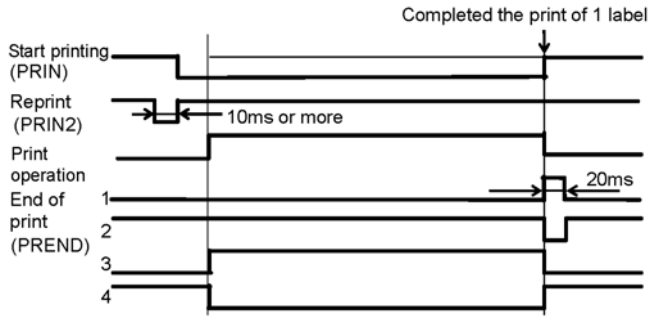
START PRINTING

(Figure 3-9a)



REPRINTING

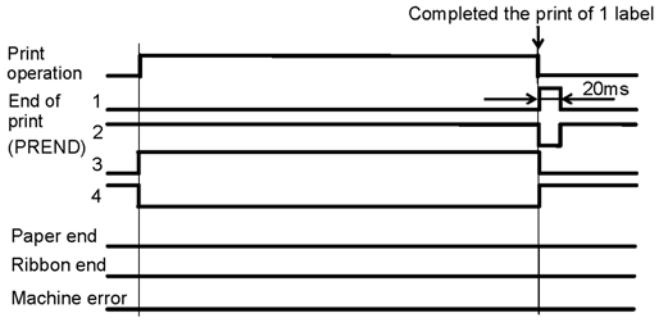
(Figure 3-9b)



OUTPUT SIGNAL WAVE FORM

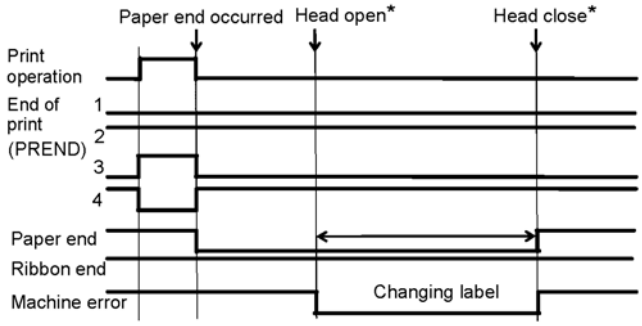
BASIC OPERATION

(Figure 3-10a)



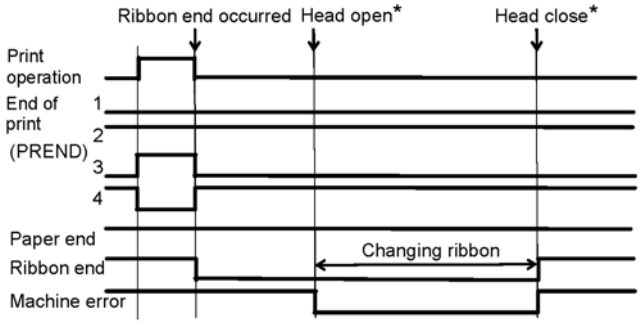
PAPER END

(Figure 3-10b)



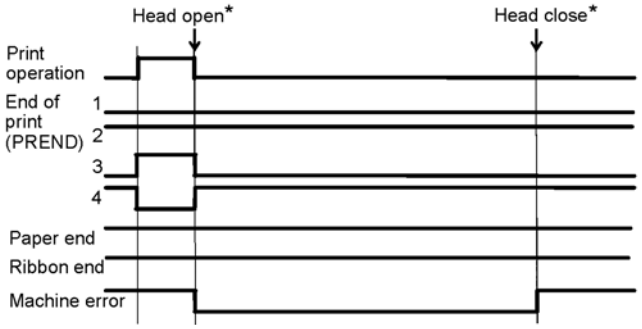
RIBBON END

(Figure 3-10c)



MACHINE ERROR

(Figure 3-10d)



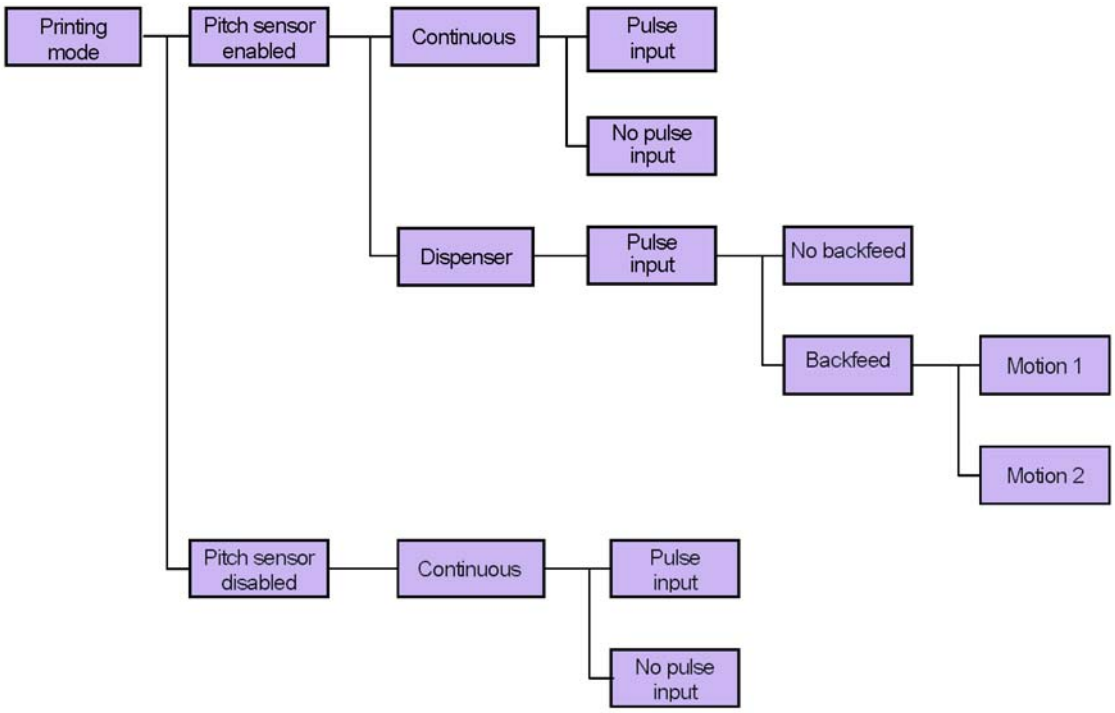


Figure 3-11, Operation Mode Flow Chart

4

ACCESSORIES INSTALLATION

- **Interface Installation**
- **Compact Flash Card**
- **Remote Operator Panel**

ACCESSORIES INSTALLATION

This unit provides installation instructions of the purchase options available for this printer. These instructions only cover physical hardware installation. Refer to the Printer Configuration unit of this manual to configure the printer for their use.

INTERFACE INSTALLATION

The diagram below displays the physical installation of interface hardware. Refer to the Configuration unit of this manual for instructions on printer setup for the interface type chosen.

1. Switch off the printer (1, Figure 4-1) and and follow applicable lockout-tagout procedures.
2. Remove interface slot covering (not shown) from printer (1) as applicable.
3. Insert chosen interface board (2) into its assigned slot and secure using two screws (3).

> NOTE: The interface slot identified EXT is assigned for peripheral device connection. The center slot is asigned for standard interface card connection. And the remaining slot is for use with PCI interface cards.

4. Repeat steps 2 and 3 for additional interface cards as applicable.

> NOTE: Dependent on individual setup and operational requirements, multiple interface cards may be required.

5. Connect interface cable (not shown).

> NOTE: The interface cable to be used is dependent upon the type of card and the device to be connected. Refer to this printer's operator manual for specific printer connection instructions. Refer to peripheral device's documentation for its connector identification.

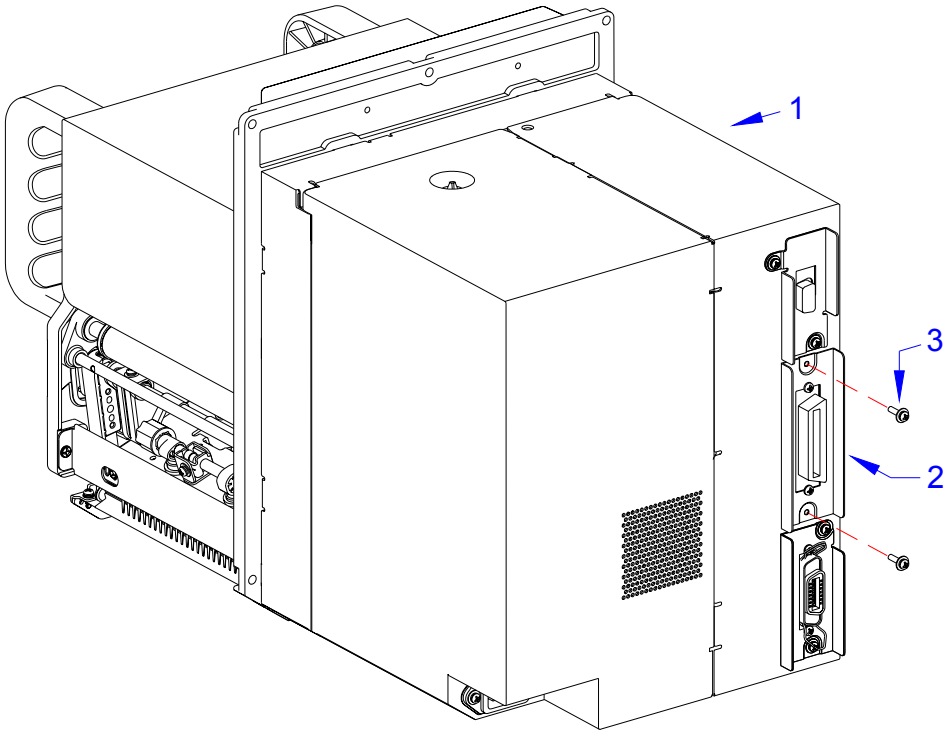


Figure 4-1, Interface Installation

COMPACT FLASH CARD

The compact flash card provides an expanded storage location to enhance the capabilities and functionality of the printer. This area may be used to store fonts, graphics, and formats. It can alos be used to store custom programs, put the in Stand Alone Mode, or to simply copy printer settings.

1. Switch off the printer and and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open rear housing covers to access flash-memory card (1, Figure 4-2).

NOTE: Figure 9-1 of the Appendix unit provides guidance on opening housing covers.

CAUTION: OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Withdraw defective flash-memory card (1) from flash-memory board (2).
4. Insert replacement flash-memory card (1) into flash-memory board (2).
5. Close rear housing covers, install interface cards, restore power, and download to ensure proper function.

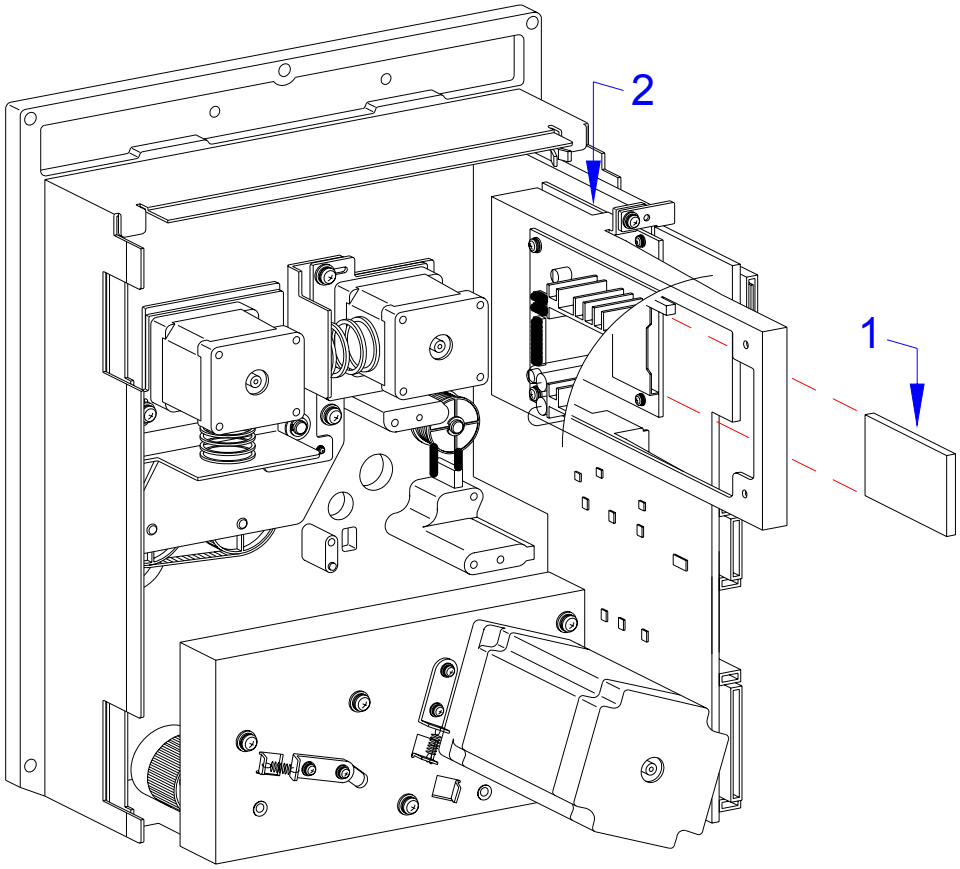


Figure 4-2, Compact Flash-Memory Card Installation

REMOTE OPERATOR PANEL

This purchase option allows the operator panel to be detached from the printer and secured in a remote location convenient for user access. Refer to the instructions provided with the kit for installation guidance.

5

PRINTER CONFIGURATION

- **Printer Configuration**
- **Configuration Modes**
- **Menu Definition Tables**

PRINTER CONFIGURATION

This unit provides in-depth instruction on printer configuration for operation and for some troubleshooting.

The printer may be configured via the buttons and/or potentiometers located on the printer's operator panel. All of the printer's buttons, switches, and potentiometers are used singularly, or in conjunction, to perform configuration activities.

Refer to the Control Features chapter of the Introduction unit for identification of specific interface features.

CONFIGURATION MODES

This chapter provides an overview of the various configuration modes of the operation menu. All of the configuration activities are performed via the use of the operator panel located on the printer's face. However, many settings may also be controlled via external software commands. In the case of conflict between external software commands and internal software commands (control panel settings) the printer will always use the last valid setting, unless a priority function is provided via the LCD menu.

USER MODE

This mode allows configuration of printing features that are prone to change from job to job. These are some of the most basic and common adjustments of all of the configuration modes.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

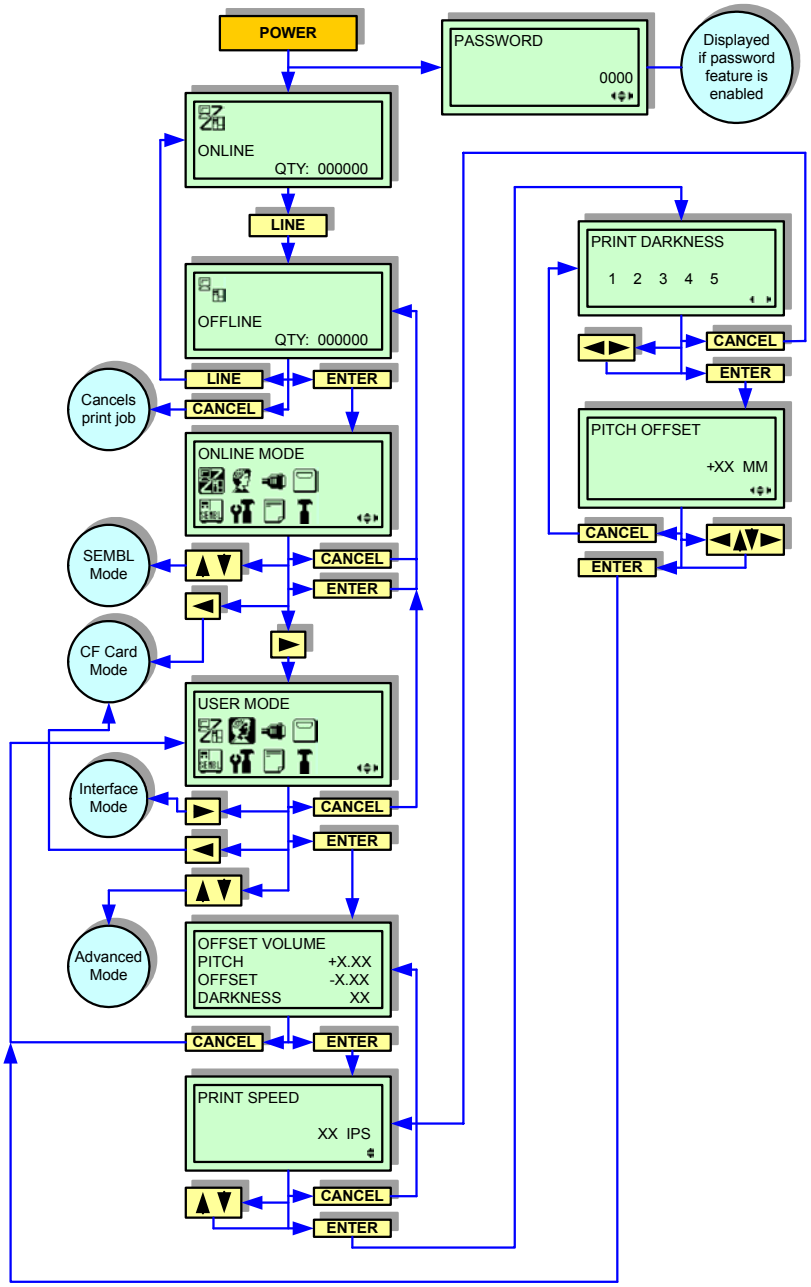


Figure 5-1, User Mode

ADVANCED MODE

The Advanced Mode is provided to make advanced printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless the application changes significantly.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

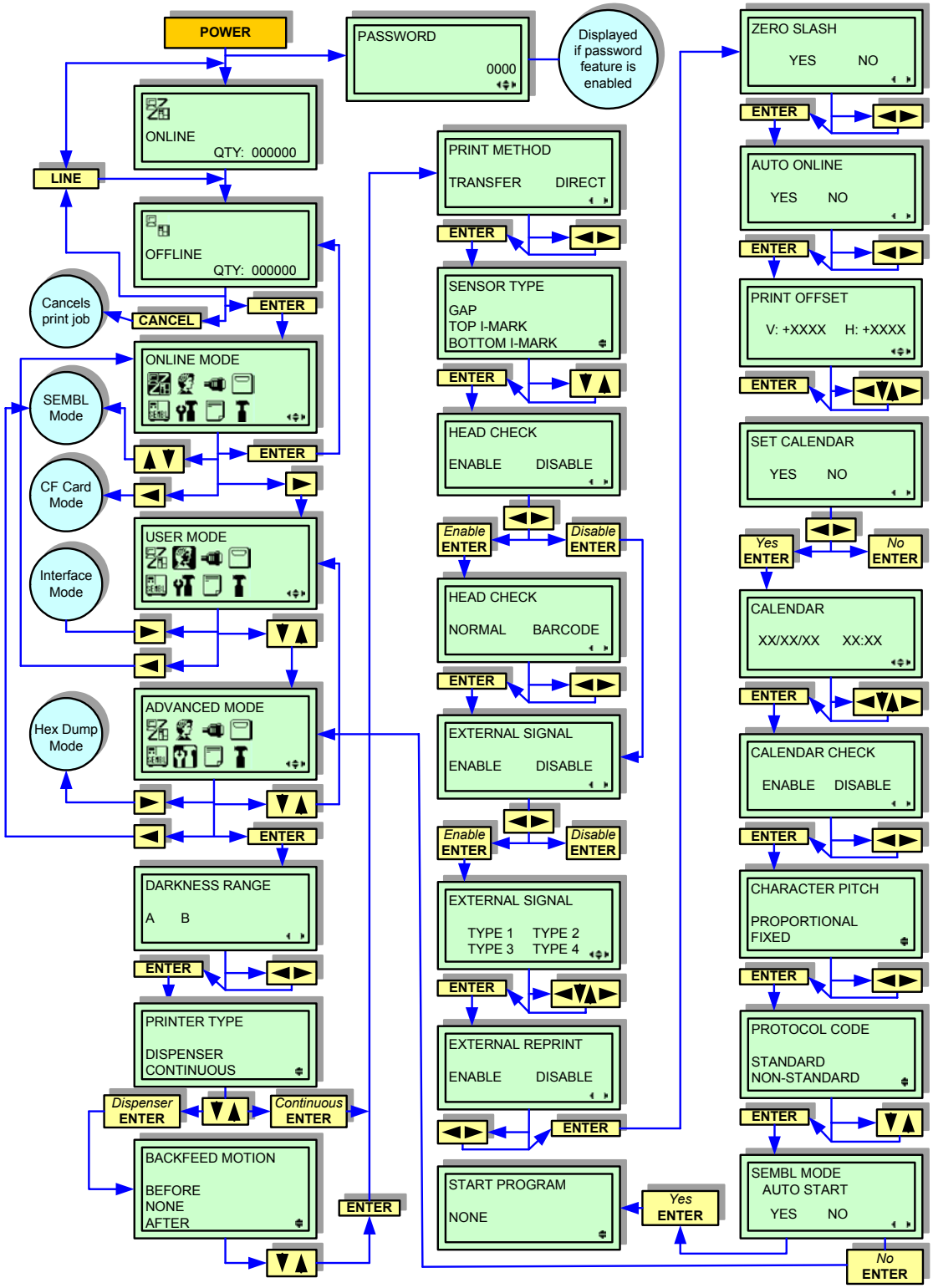


Figure 5-2, Advanced Mode

PARALLEL INTERFACE MODE

This chapter provides the programming sequences required for IEEE1284 interface setup.

Use the keys of the printer's operator panel and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

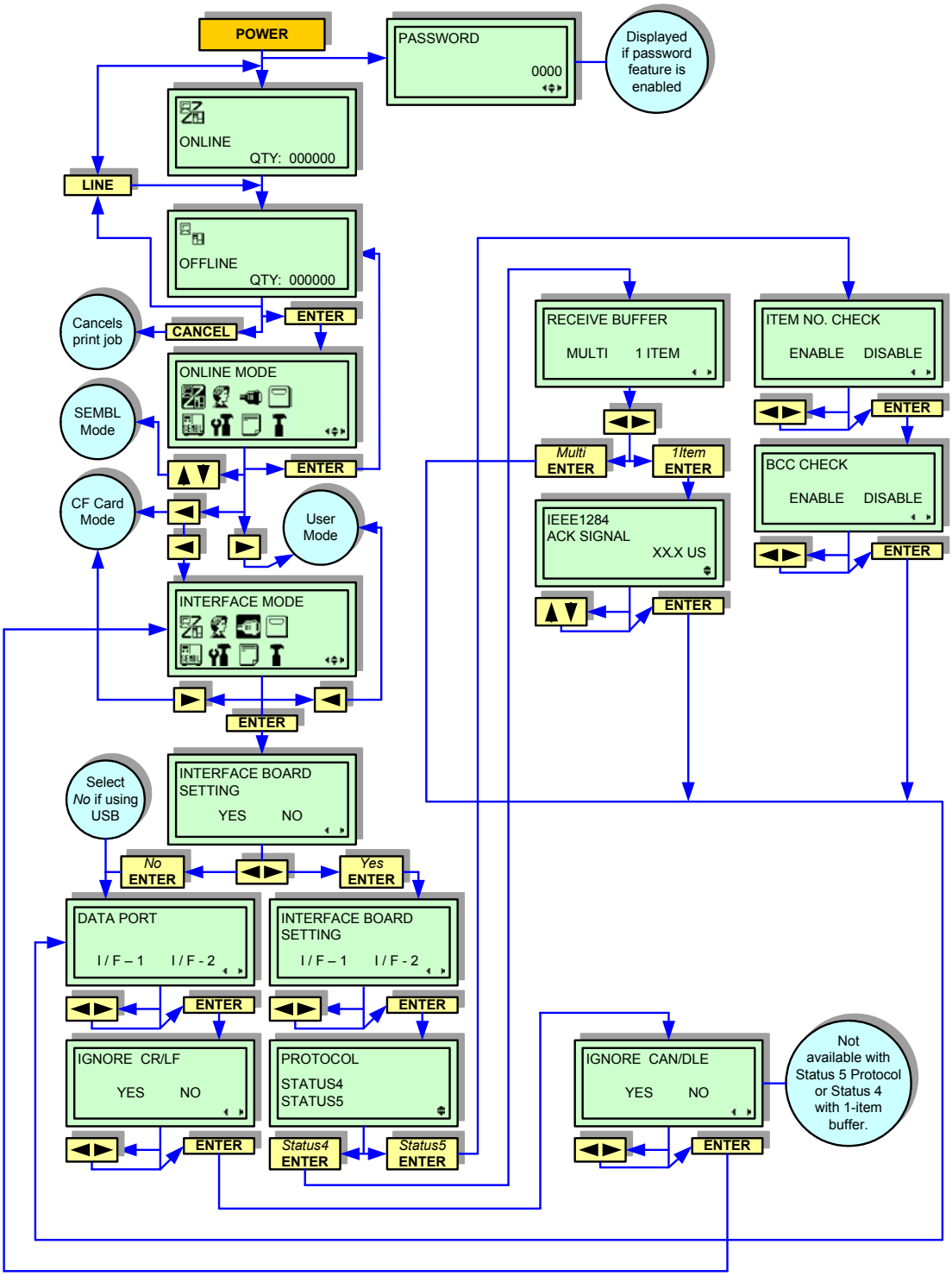


Figure 5-3, Parallel Interface Mode

SERIAL INTERFACE MODE

This chapter provides the programming sequences required for RS232, RS422, or RS485 interface setup.

Use the keys of the operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

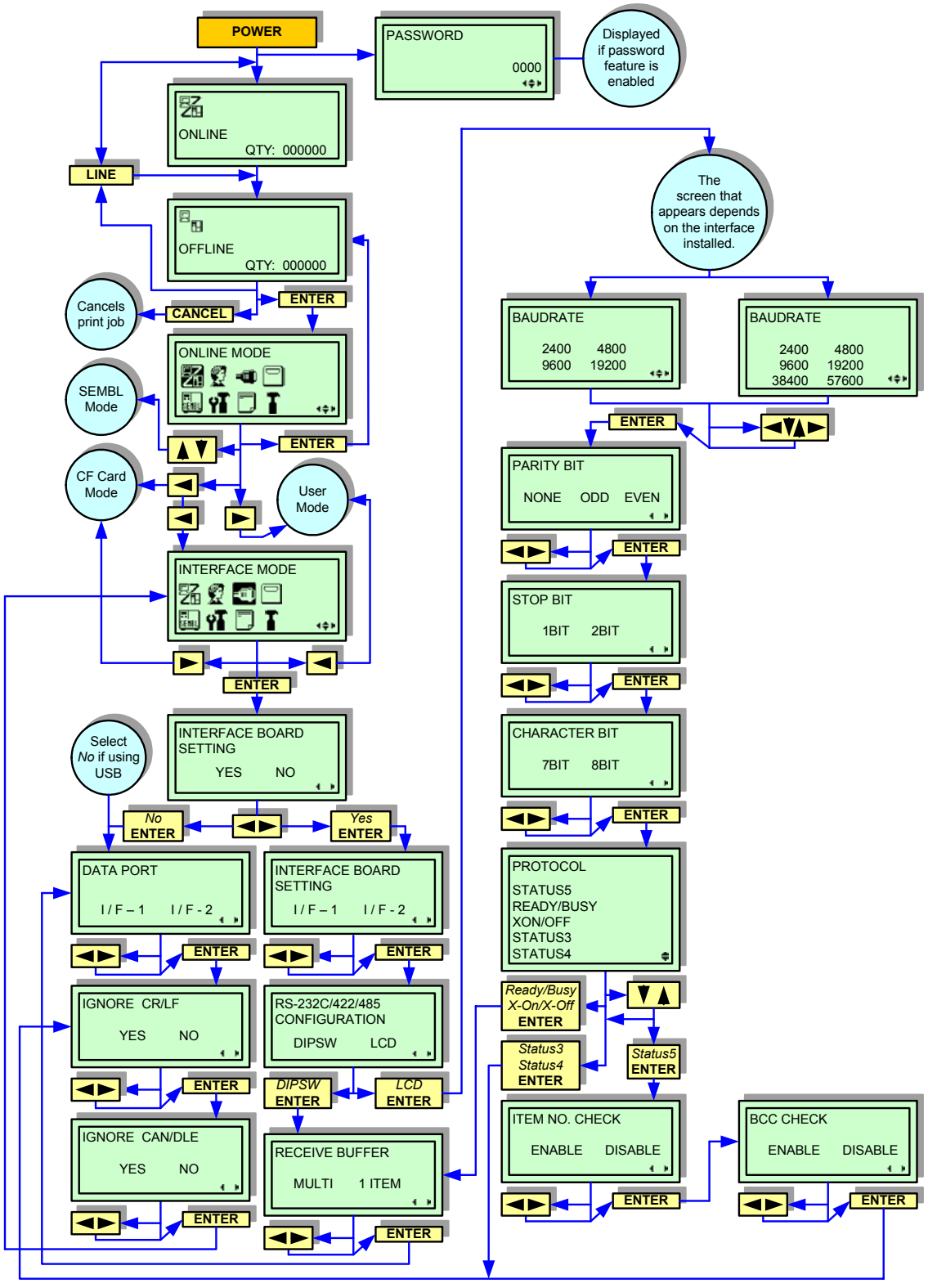


Figure 5-4, Serial Interface Mode

LOCAL AREA NETWORK (LAN) INTERFACE MODE

This chapter provides the programming sequences required for LAN setup.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

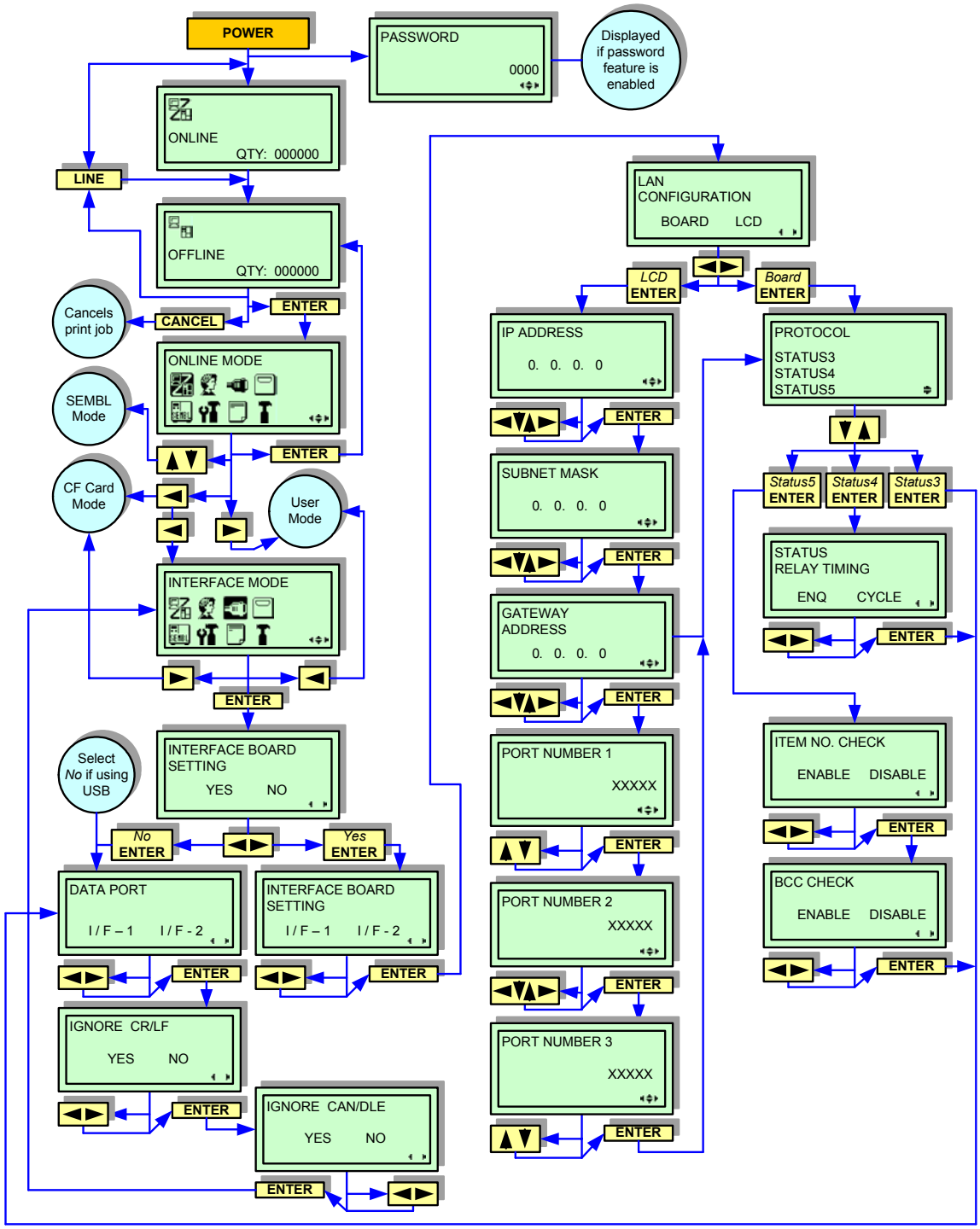


Figure 5-5, LAN Interface Mode

UNIVERSAL SERIAL BUS (USB) MODE

This chapter provides the programming sequences required for USB interface setup.

Use the keys of the printer's operator panel to select and enter the required option. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

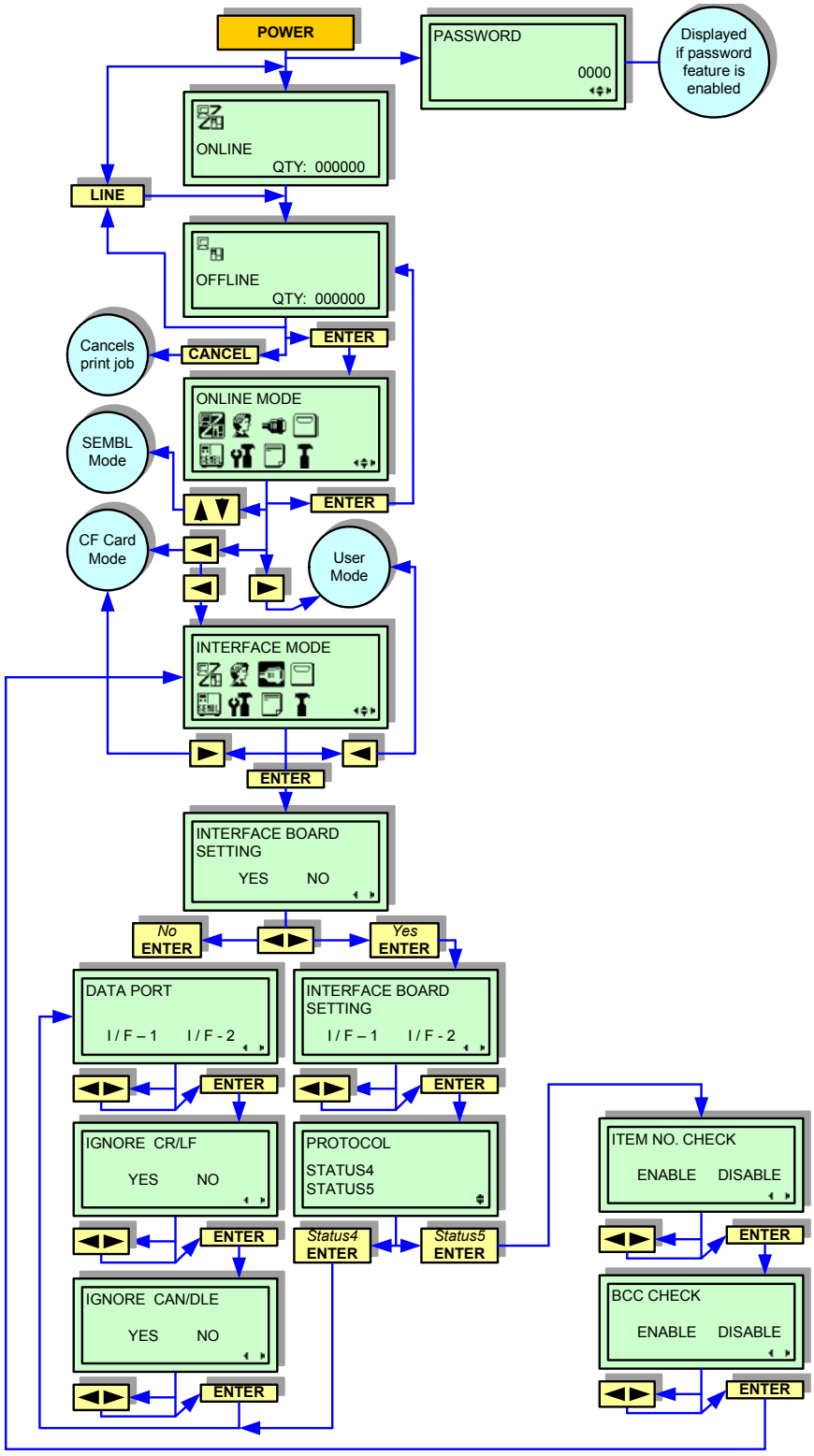


Figure 5-6, USB Interface Mode

CENTRONICS INTERFACE MODE

This chapter provides the programming sequences required for Centronics interface setup.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

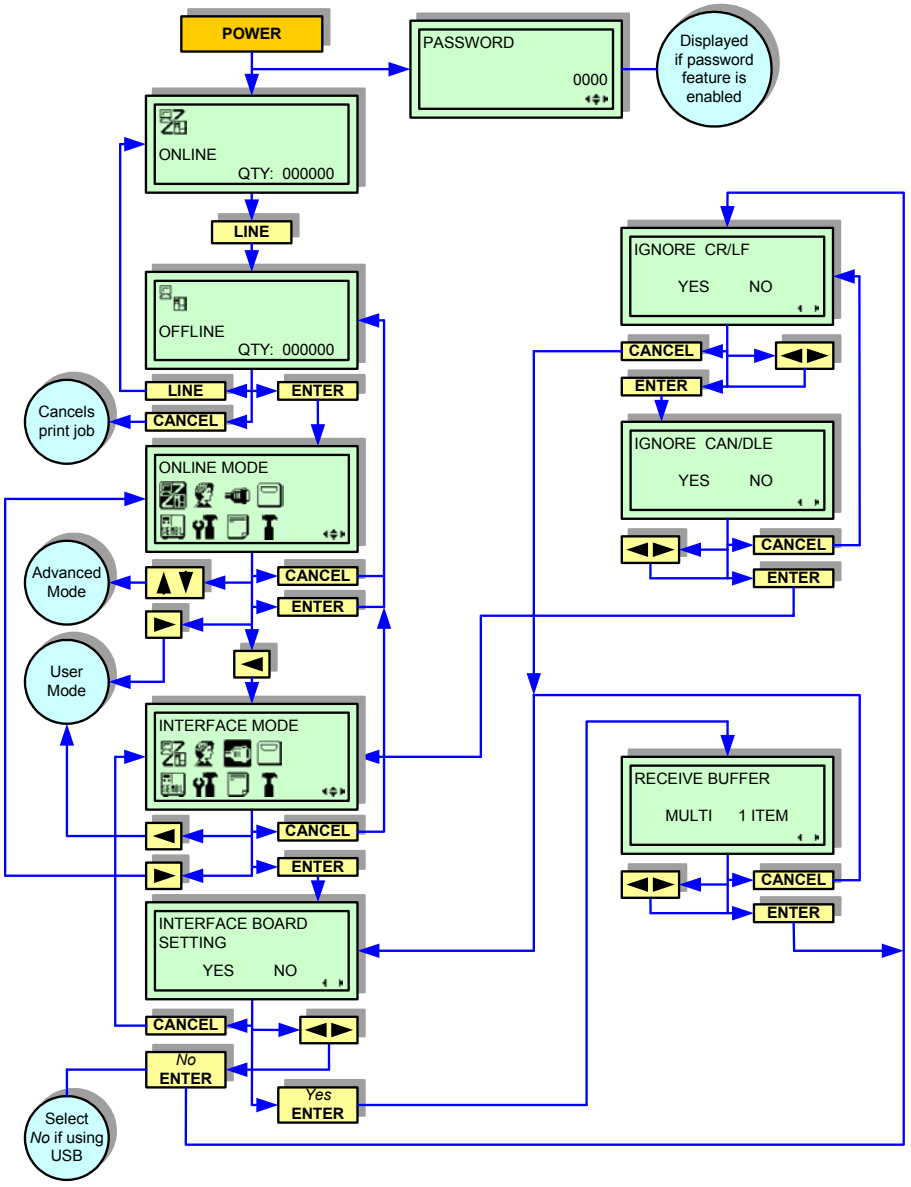


Figure 5-7, Centronics Interface Mode

WIRELESS LAN (LOCAL AREA NETWORK) INTERFACE MODE

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

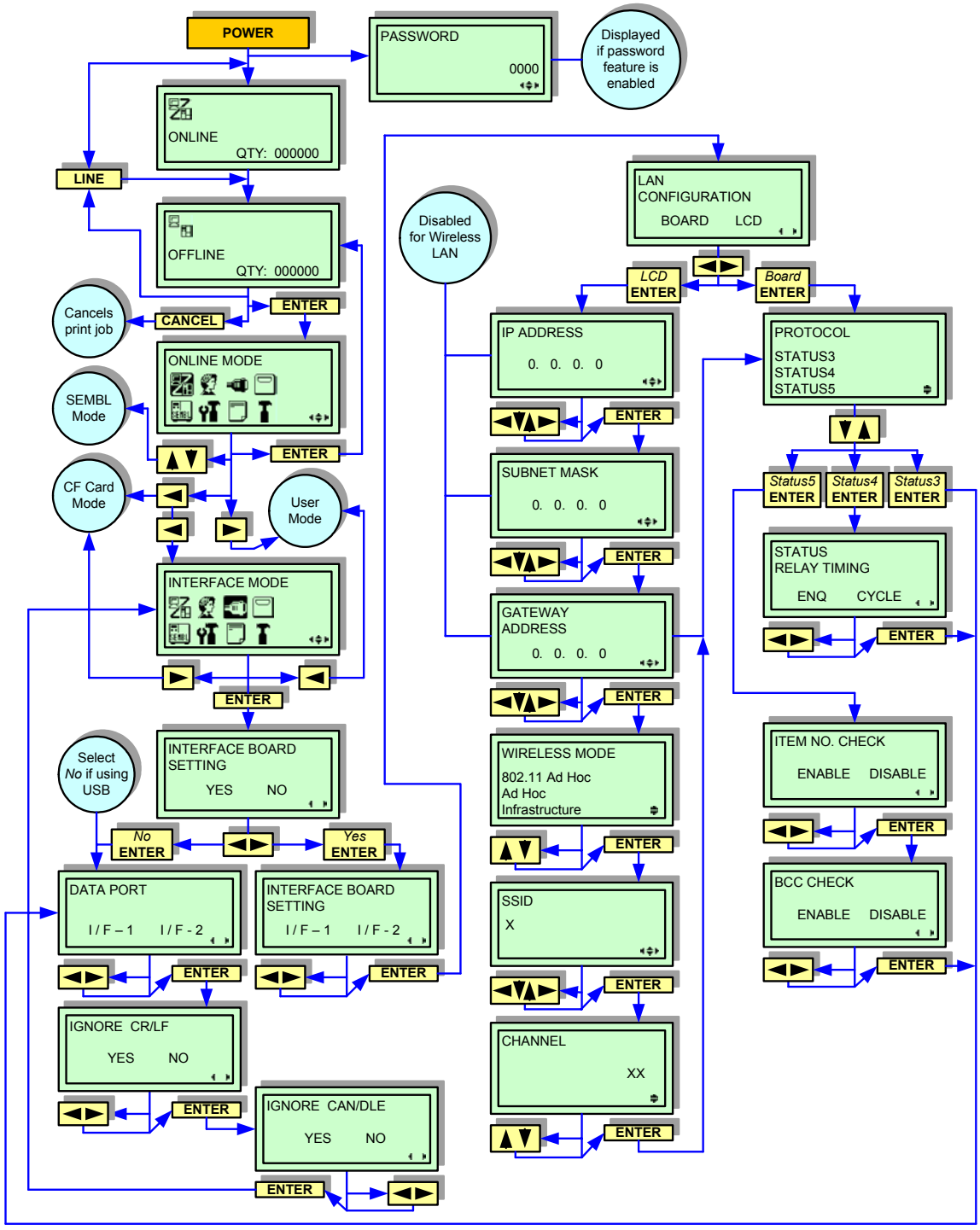


Figure 5-8, Wireless LAN Interface Mode

SERVICE MODE

Allows the programming of various dimensional settings, sensor thresholds, and language options.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

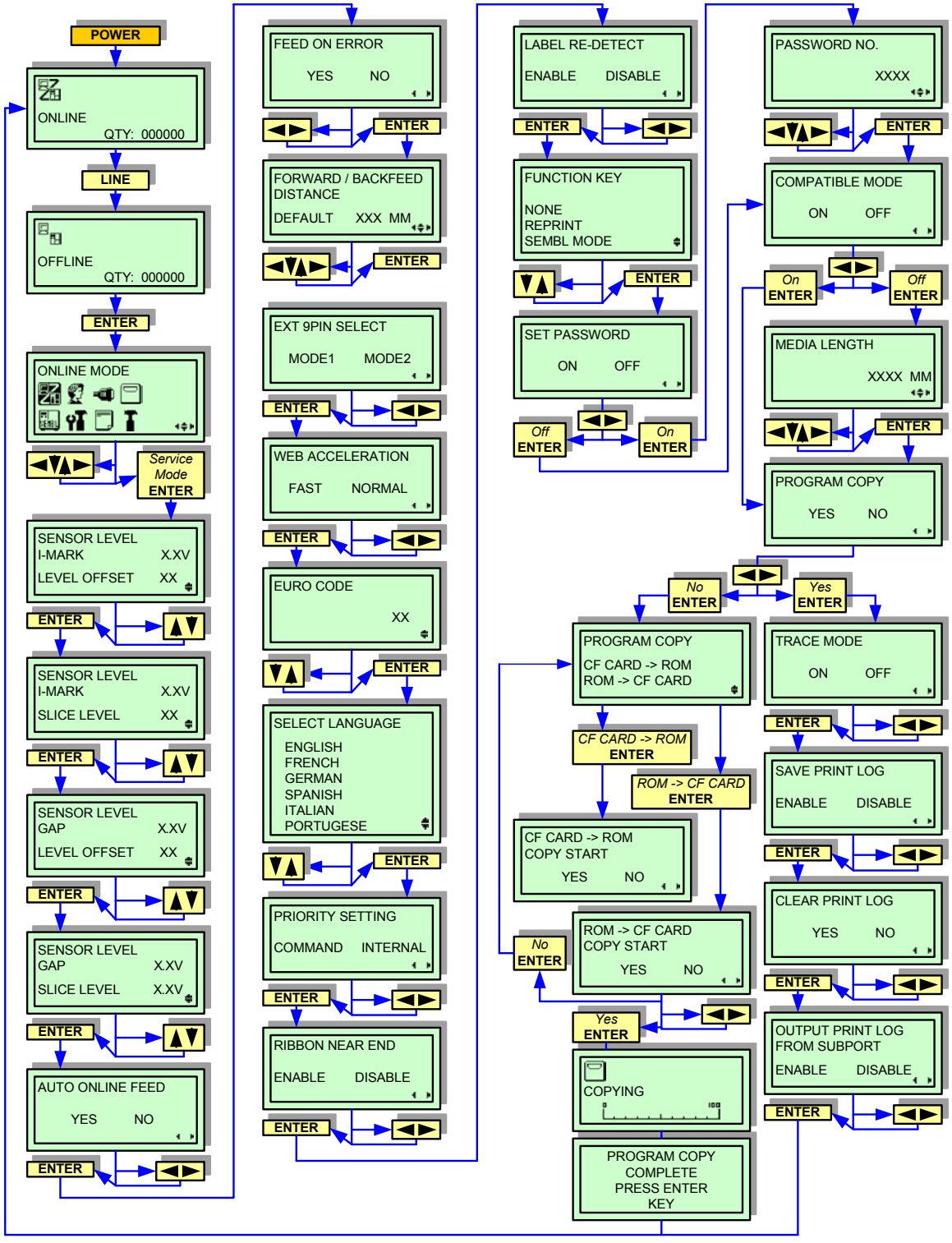


Figure 5-9, Service Mode

FACTORY MODE

The Factory Mode permits counter reset of various components.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

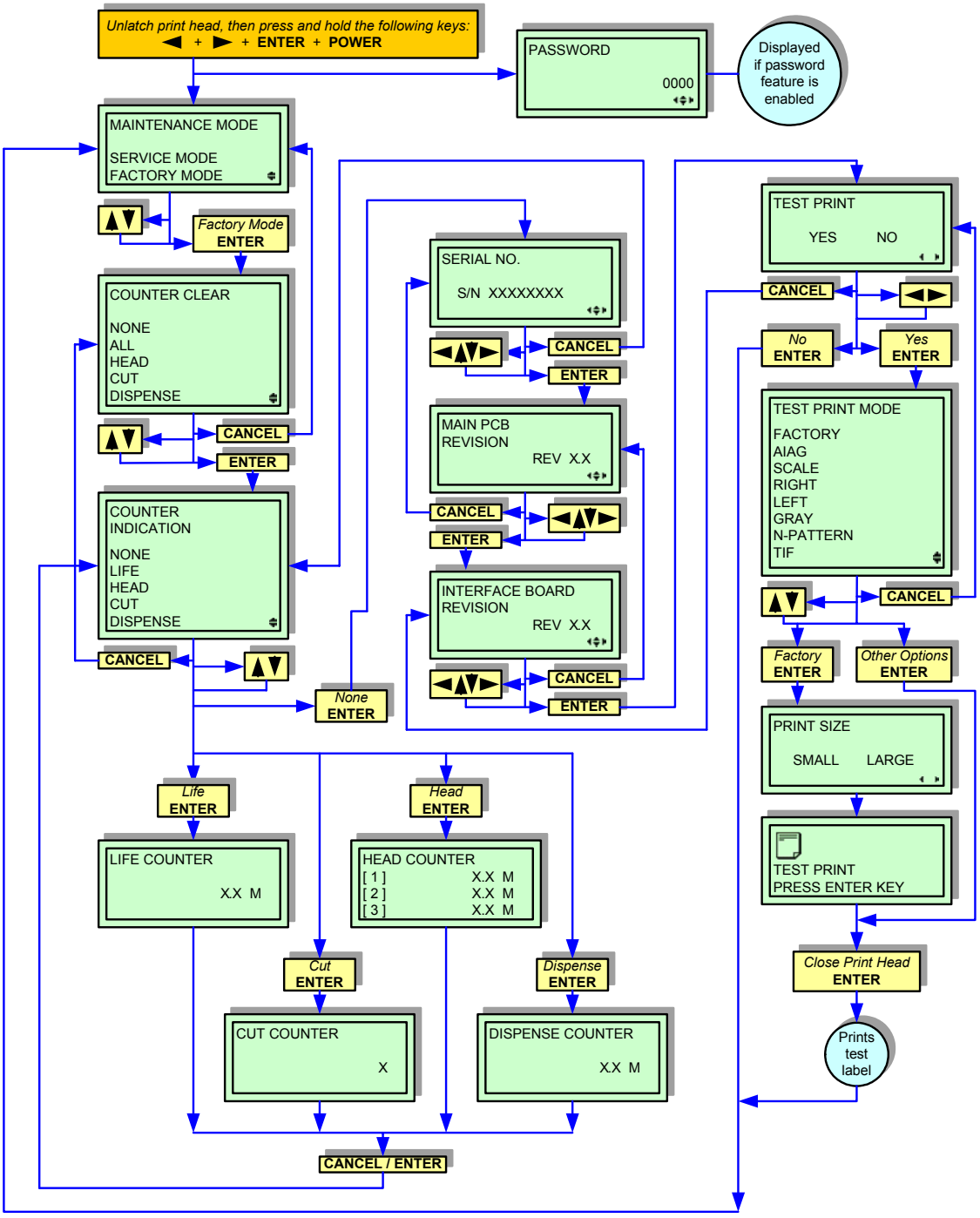


Figure 5-10, Factory Mode

WORK SHIFT MODE

The Work Shift Mode allows for specific production shift information to be printed on a label when used with the printer SBPL command.

Use the keys of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

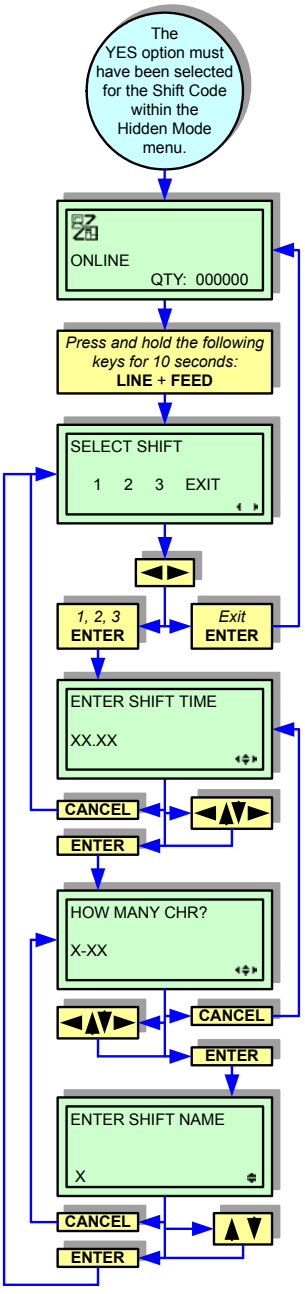


Figure 5-11, Work Shift Mode

HIDDEN MODE

The Hidden Mode allows operator access to set Label-Out Sensor status and Work Shift mode status.

Figure 5-12 provides the specific sequence of events required by the operator, the printer, and the printer's software. Use the printer's operator panel to select and enter the required options.

Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

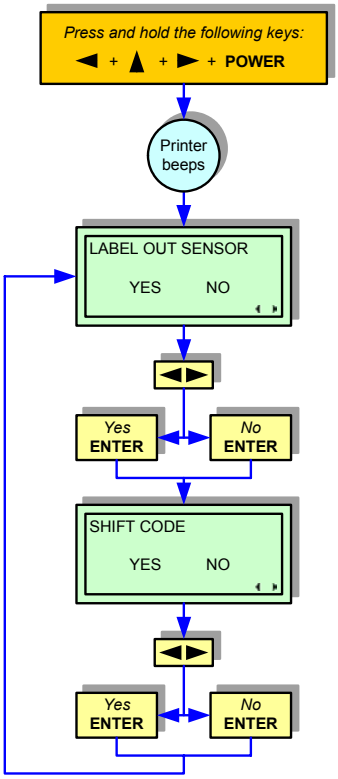


Figure 5-12, Hidden Mode

DOWNLOAD MODE

This download feature allows the operator to upgrade or downgrade firmware to the printer. When downloading is complete, the LCD screen will return to the original display. If an error occurs, a DOWNLOAD ERROR will display.

Use the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

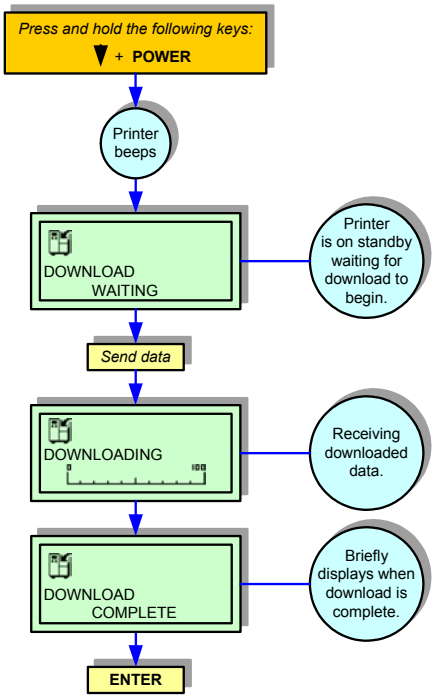


Figure 5-13, Download Mode

BOOT DOWNLOAD MODE

This download mode is used when the firmware becomes corrupted and the normal download mode is not successful.

Use the printer's keys to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

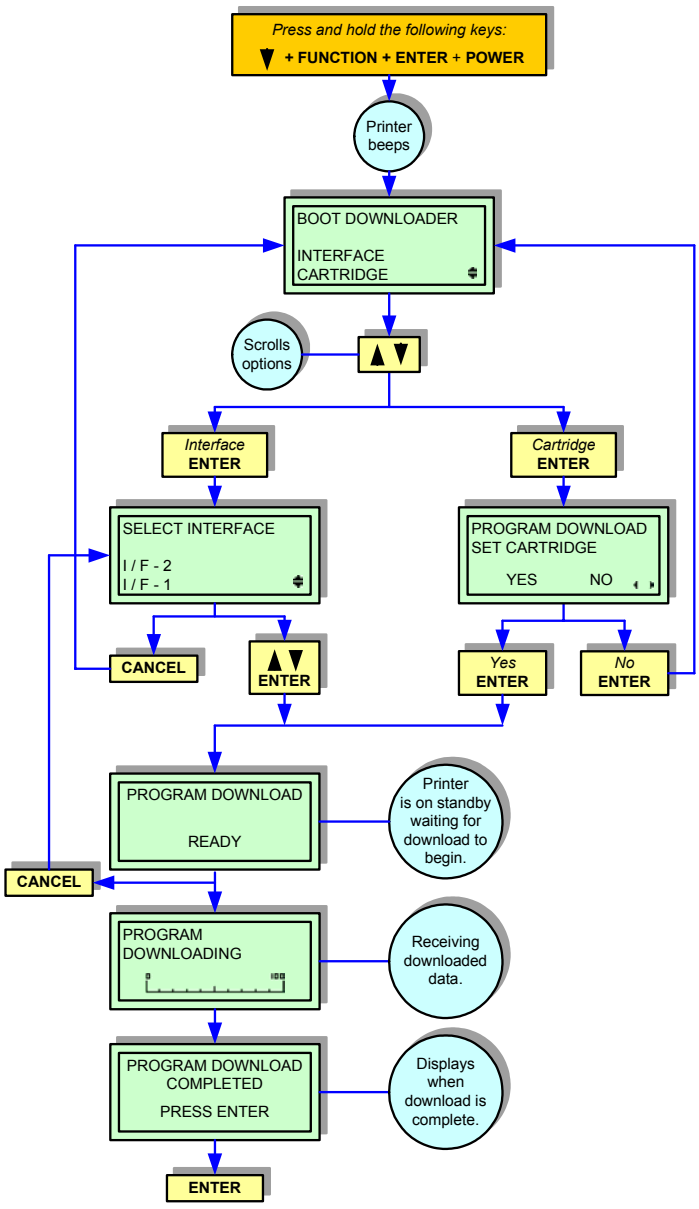


Figure 5-14, Boot Download Mode

PRINT CANCEL MODE

Figure 5-15 provides the specific sequence of events required by the operator, the printer, and the printer's software to cancel a print job once initiated.

Use the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

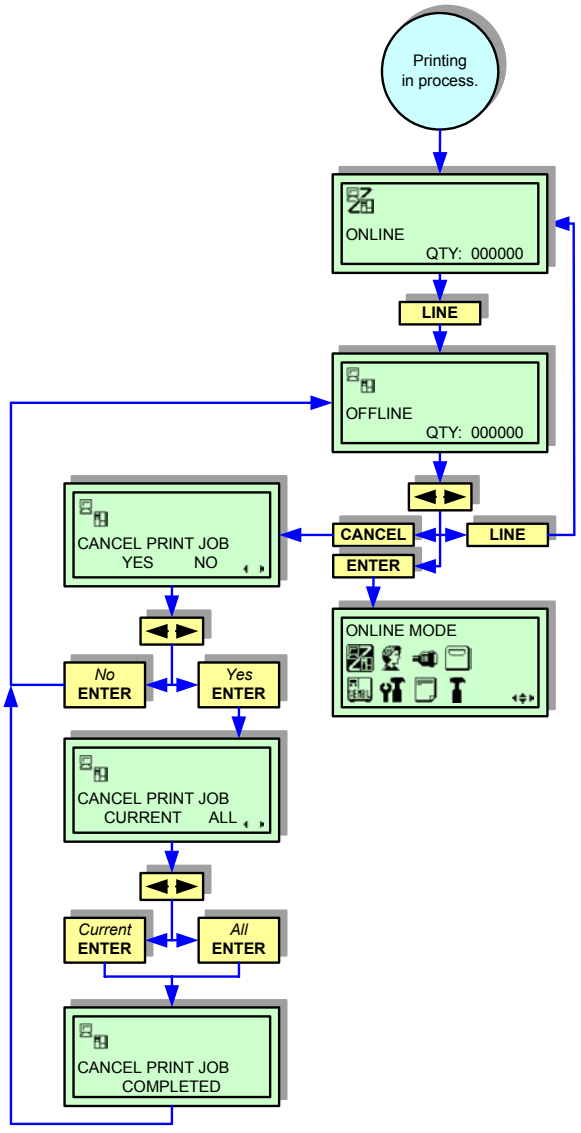


Figure 5-15, Print Cancel Mode

DEFAULT SETTINGS MODE

Figure 5-16 provides the specific sequence of events required by the operator, the printer, and the printer's software to return the printer to the configuration as received from the factory.

Use the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

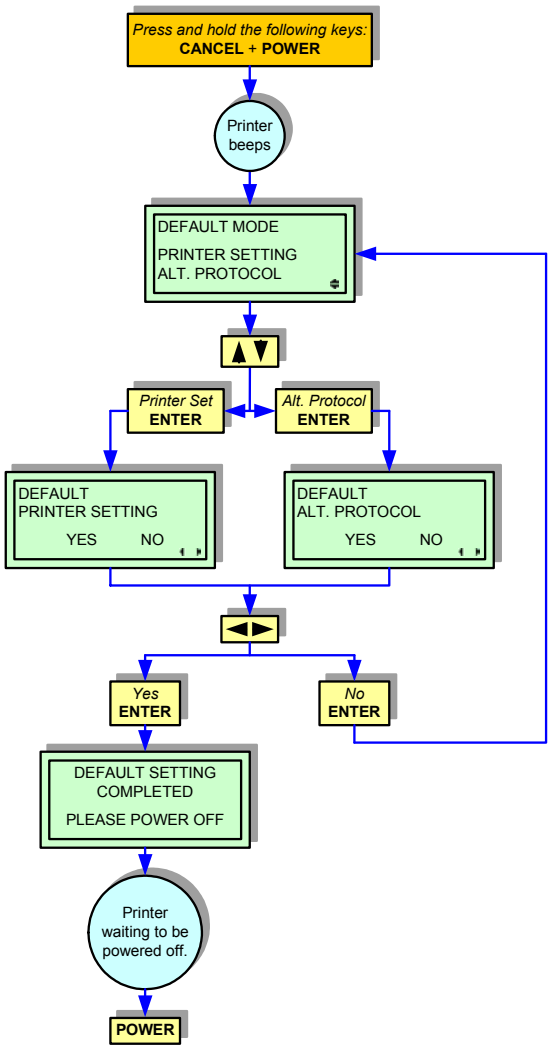


Figure 5-16, Default Settings Mode

TEST PRINT MODE

Figure 5-17 provides the specific sequence of events required by the operator. the printer, and the printer's software for a test label to be printed. Test labels are designed to identify failures in configuration, adjustment problems, and mechanical defects.

Use the keys on the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanantion of each menu screen.

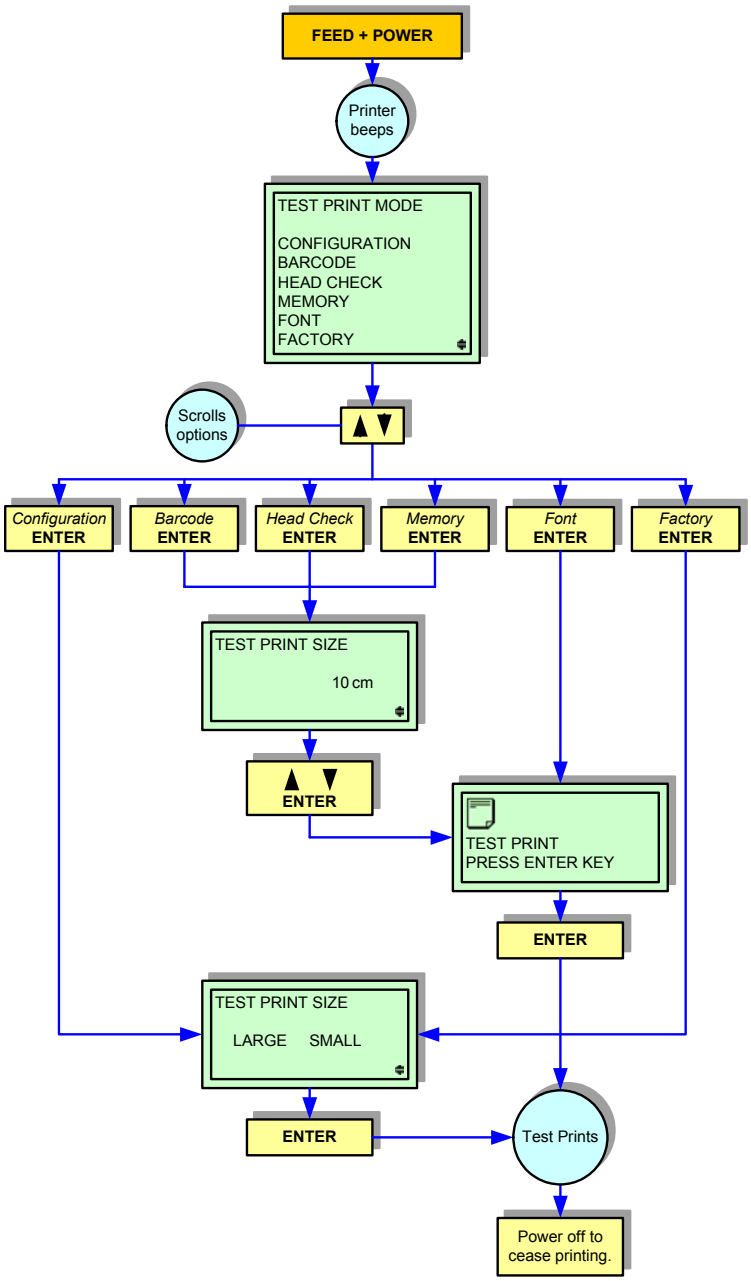


Figure 5-17, Test Print Mode

HEX DUMP MODE

The contents of the print buffer and the data received before it is placed into the print buffer may be examined through the use of the Hex Dump Mode. Each line of the printed data is enumerated in the first column, the second column contains the data in hexadecimal format, and the right column contains the same data in ASCII format.

The options of data to be printed are: receive data, receive buffer, and internal data. However, only one type of data may be printed on a single label. Repeat the dump process to print the other data types as desired.

Use the keys on the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of each menu screen.

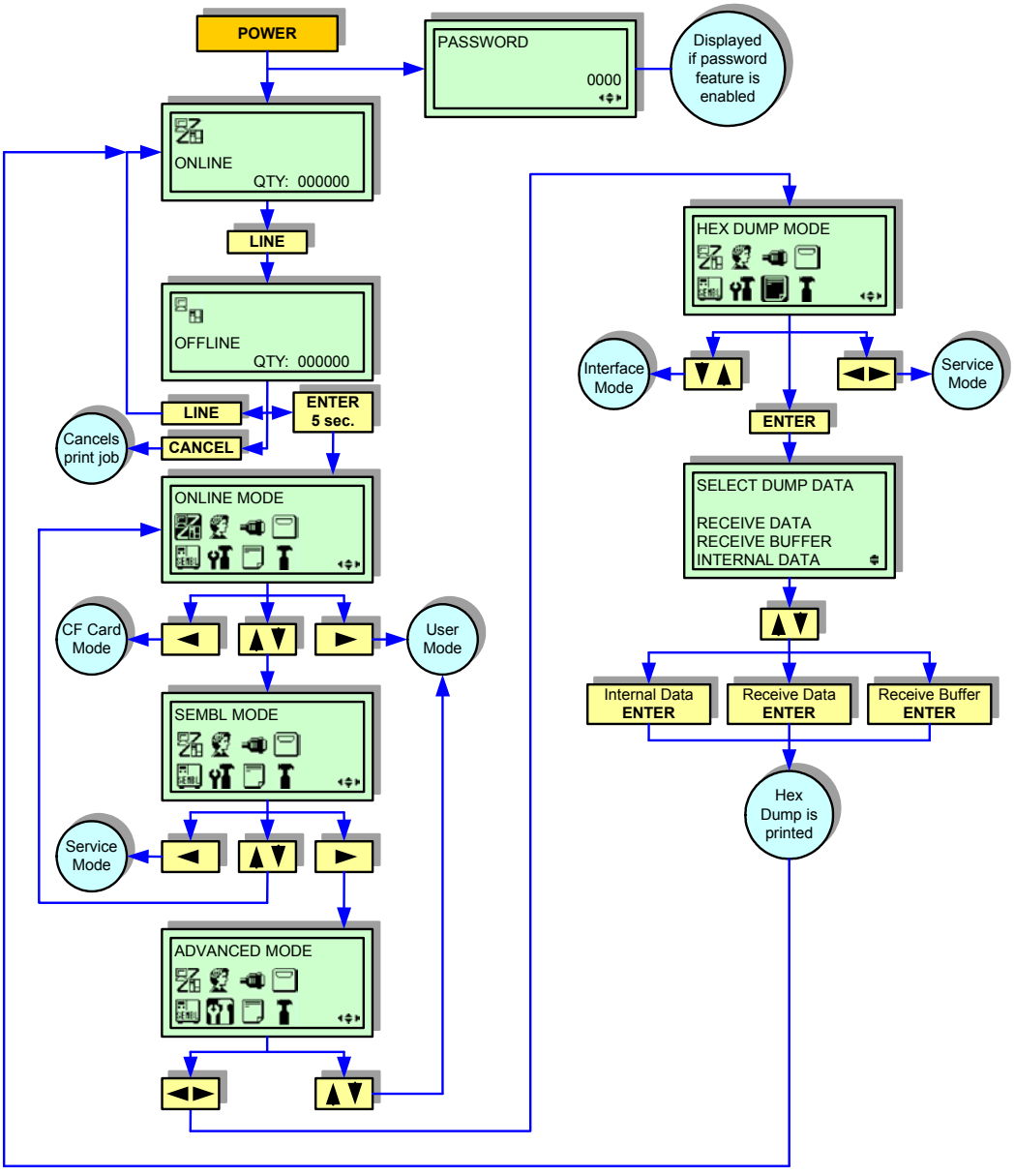


Figure 5-18, Hex Dump Mode

CF (COMPACT FLASH) CARD MODE

Use the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in the following chapter to provide an explanation of eachmeny screen.

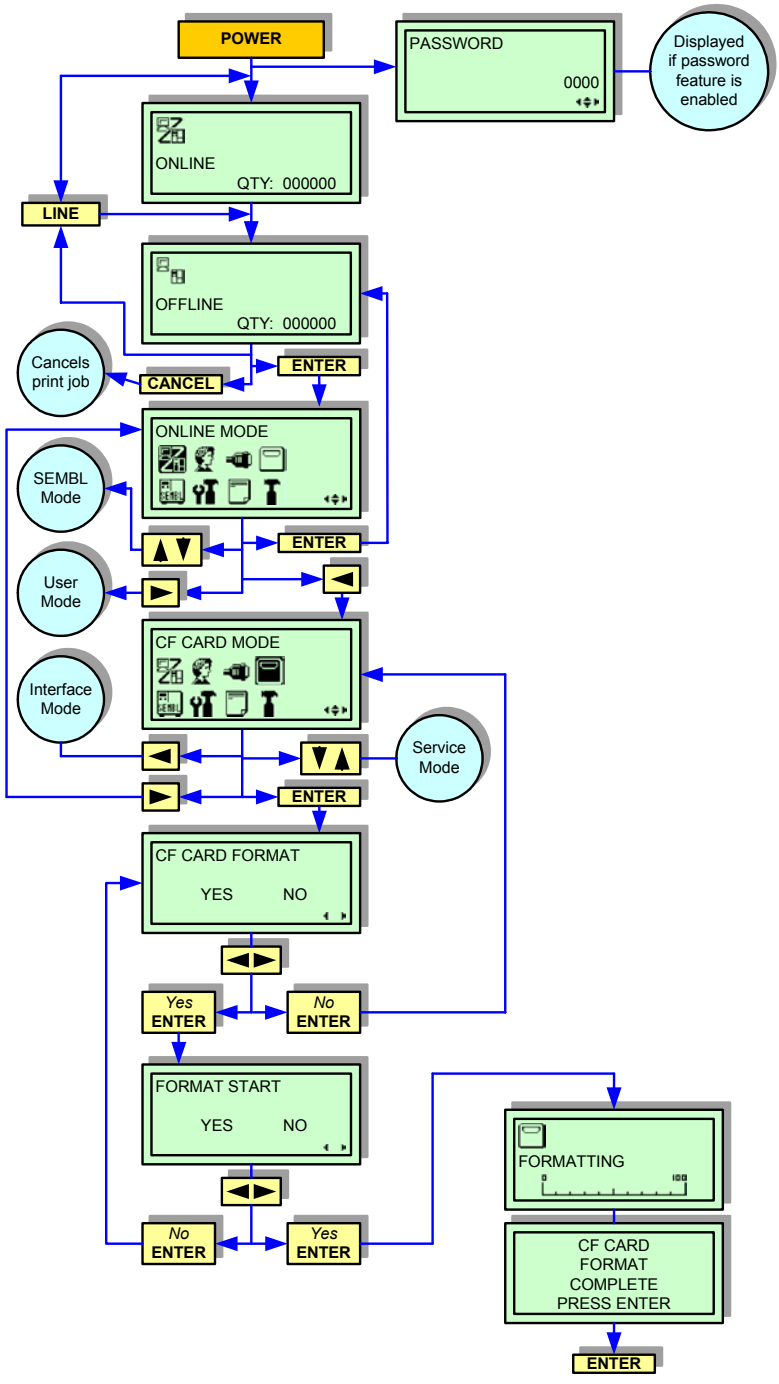


Figure 5-19, CF Card Mode

STAND ALONE MODE

The Stand Alone Mode allows the printer to function independently from a host computer once a fixed format has been sent, and saved, to the flash-memory card.

The data may be saved to the flash-memory card while in the print buffer, and then recalled later with a new print quantity indicated. The flash-memory card will only hold a single format at a time; new formats will overwrite the existing saved format. The host computer must be reconnected to the printer to overwrite an existing format.

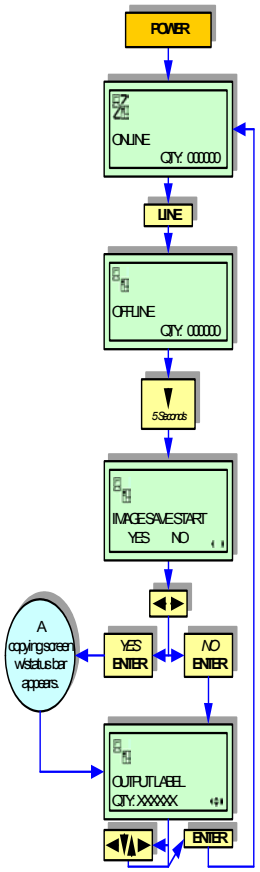
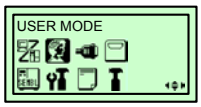
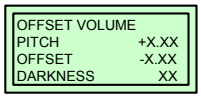
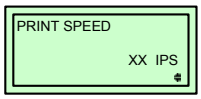
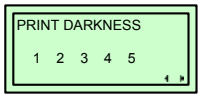
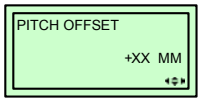
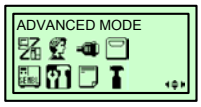
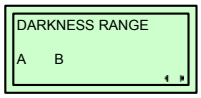
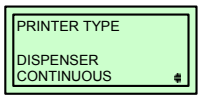
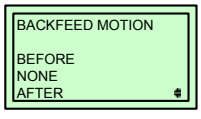
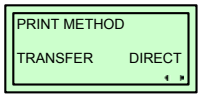
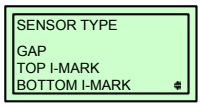
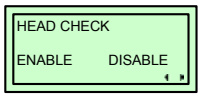
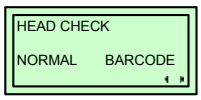
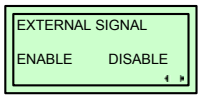
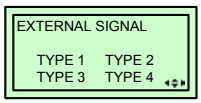
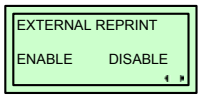
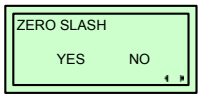
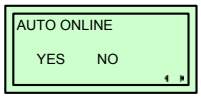
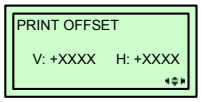


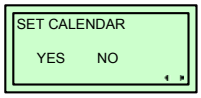
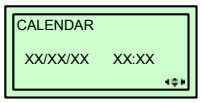
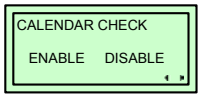
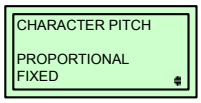
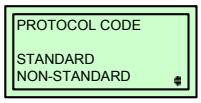
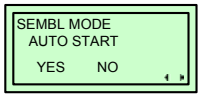
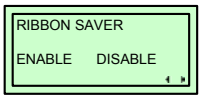
Figure 5-20, Stand Alone Mode

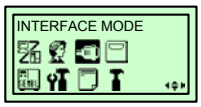
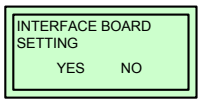
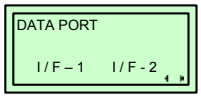
MENU DEFINITION TABLES

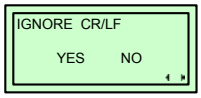
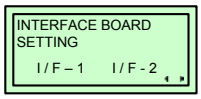
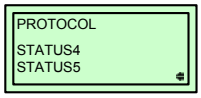
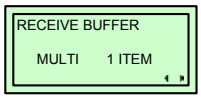
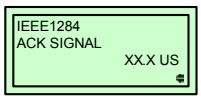
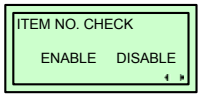
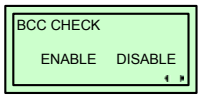
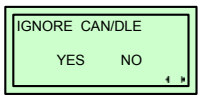
USER MODE (TABLE 5-1)	
MENU	**DESCRIPTION**
	Is the entrance screen to the User Mode. The User Mode allows various print parameters to be set.
	This screen shows the adjusted value for the potentiometers on the Operator Panel. Entry is not required for this screen. The values will change as the potentiometers are adjusted.
	Permits the printer's print speed to be established based on inches per second (IPS).
	Permits the adjustment of the print density. Higher print density equates to darker print images.
	The label pitch is the distance from the leading edge (the edge that comes out of the printer first) of a label and the leading edge of the next label. The position of the label's leading edge can be adjusted relative to the print head in increments of 1mm. Once the position has been set, it can be fine adjusted using the PITCH potentiometer. Positive (+) digit selection on the display moves the leading edge forward and away from the print head while a negative (-) selection moves the label's leading edge incrementally back into the mechanism.

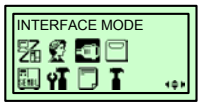
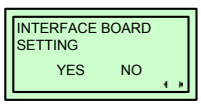
ADVANCED MODE (TABLE 5-2)	
MENU	**DESCRIPTION**
	Is the first menu screen of the Advanced Mode. The Advanced Mode is provided to make advanced printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless the application significantly changes.
	This menu sets the darkness range used by PRINT DARKNESS screen in the User Mode. Darkness range A is the default. Darkness range B offers higher temperatures across the print darkness range and may be necessary when using high resin content ribbons.
	Allows choice of continuous feed or dispenser operation.
	Allows the determination of whether a backfeed motion will be applied. Is so, the selection of before or after the printing of each label.

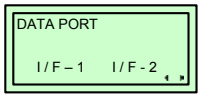
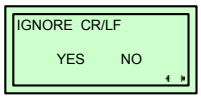
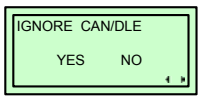
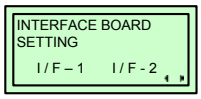
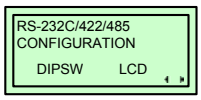
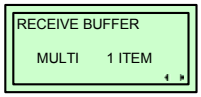
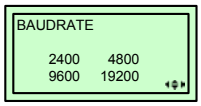
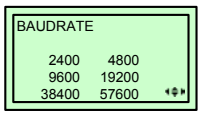
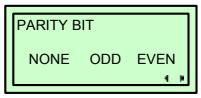
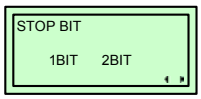
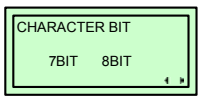
ADVANCED MODE (TABLE 5-2)	
MENU	**DESCRIPTION**
	Allows the printer to be switched to operate in the thermal transfer or direct thermal mode as desired.
	Allows the pitch sensor mode to be selected relative to the media type being used.
	This feature determines the intensity of the print head elements when enabled. The printer will go into error mode when a malfunctioning print head element is detected.
	This screen will appear if the print head check feature has been enabled. Choose for the head check to be performed unconditionally or only when barcodes are being printed. Previously printed barcodes should be scanned following an error to determine their functionality.
	Set this feature to enable or disable an external signal for other printer's communication port. If the port is enabled, an external print start signal can be sent and received using an appropriate device plugged into the EXT port.
	Appears only if the printer's external signal feature has been enabled to allow selection of the output signal. For information on which type to choose, refer to the printer's Programming Reference for guidance.
	Allows configuration as to whether the reprint function may be activated via the external signal port.
	Allows for selection of specific SEMBL program to be stated when SEMBL mode AUTO START selection is YES.
	This menu allows for the printer to be configured to print zeros with or without a diagonal slash through them. This will apply to all printer font types.
	The printer can be set to go into the online mode when powered on. Otherwise, the printer starts in the offline state and must be manually placed online before it is ready to print.
	Print offset refers to the vertical and horizontal shifting of the entire print area relative to the label and the print start position. The movement is incremental by dots in the positive (+) or negative (-) direction. Positive and negative vertical adjustment is toward or away from the print head respectively. Positive and negative horizontal adjustment is to the left or right of the reference point respectively.

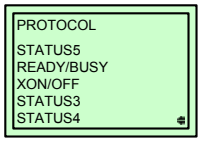
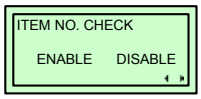
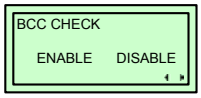
ADVANCED MODE (TABLE 5-2)	
MENU	**DESCRIPTION**
	The calendar is a feature that allows the date and time to be manually set using the operator panel or through command codes. This screen prompts to indicate whether calendar setting is desired or not. If YES is selected, the calendar setup screen will appear. If NO is selected, the menu will advance and bypass the calendar setup option.
	This menu screen allows the calendar settings to be altered. The calendar is divided into five sets of two digits. The first two allows for the year to be set, followed by the month, the day, the hour, then the minute.
	This menu screen allows the setting of the automated calendar check diagnostic function.
	Determines whether each printer character occupies a designated space (fixed) regardless of the characters width, or if the character's space is representative of its width (proportional). This will apply to all printer resident font types.
	The ESC sequence in SBPL (SATO Basic Programming Language) commands may be defined as standard (using non-printable code 1BH) or non-standard (some other user code).
	Allows the determination of whether the printer will automatically enter the SEMBL Mode upon powering on the printer.
	Allows the ribbon-saver feature to be enabled. Disabled is the default condition.

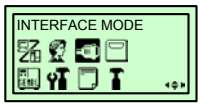
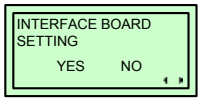
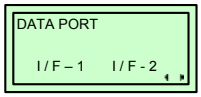
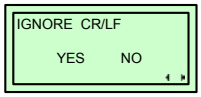
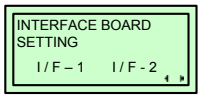
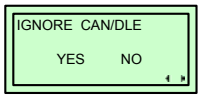
PARALLEL INTERFACE MODE (TABLE 5-3)	
MENU	**DESCRIPTION**
	Is the premiere screen of the Interface Mode. The Interface Mode allows the parameters to be set for the printer to communicate with a host and vice-versa.
	Select the YES option to configure an interface board for bi-directional communication, the menu will advance to multiple configuration screens depending on the type of interface borad installed. Selecting the NO option will bypass those screens.
	Allows the selection of which interface port will be assigned to receive print data. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for the optional PCI interface cards.

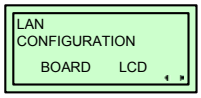
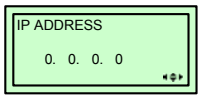
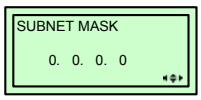
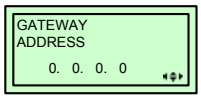
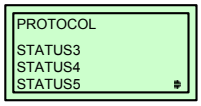
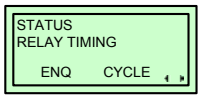
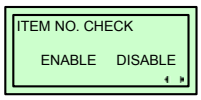
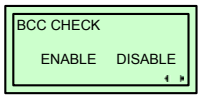
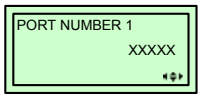
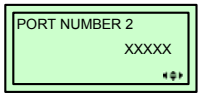
PARALLEL INTERFACE MODE (TABLE 5-3)	
MENU	**DESCRIPTION**
	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all Carriage Returns (CR) and Line Feed (LF) commands in the data stream - including graphics and 2D bar codes. Select the NO option to process them. This feature is primarily used to maintain compatibility with earlier models of SATO printers.
	Allows the selection of which interface board will be set up in subsequent menus. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for the optional PCI interface cards.
	Allows setting of bi-directional communication protocol.
	Allows the selection of the receive buffer type. Select MULTI for multiple-item buffer and 1ITEM for a single item buffer.
	Allows setting for ACK width of the IEEE1284 interface. The display will appear when the interface is present and one item (1ITEM) is selected as a receive buffer.
	Allows item number check to be enabled or disabled. Will only appear when STATUS5 is set for the protocol.
	Allows BCC Check for ACK width of the IEEE1284 interface. The display will only appear when STATUS5 is set for the protocol.
	Allows the determination of whether the Cancel (CAN) and Data Link Escape (DLE) codes will be processed or ignored. Select the YES option to ignore the codes and NO to process them. This screen will only appear when the communication protocol is STATUS4.

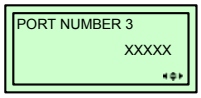
SERIAL INTERFACE MODE (TABLE 5-4)	
MENU	**DESCRIPTION**
	Is the premiere screen of the Interface Mode. The Interface Mode allows the parameters to be set for the printer to communicate with a host and vice-versa.
	Select the YES option to configure an interface board for bi-directional communication, the menu will advance to multiple configuration screens depending on the type of interface board installed. Selecting the NO option will bypass those screens.

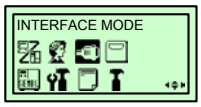
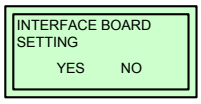
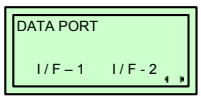
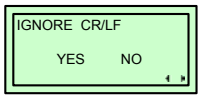
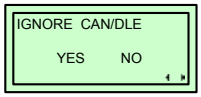
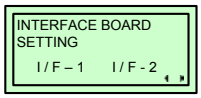
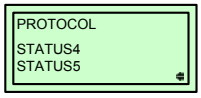
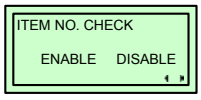
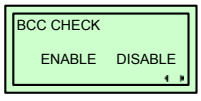
SERIAL INTERFACE MODE (TABLE 5-4)	
MENU	**DESCRIPTION**
	Allows the selection of which interface port will be assigned to receive print data. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for the optional PCI interface cards.
	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all Carriage Returns (CR) and Line Feed (LF) commands in the data stream - including graphics and 2D bar codes. Select the NO option to process them. This feature is primarily used to maintain compatibility with earlier models of SATO printers.
	Allows the determination of whether the Cancel (CAN) and Data Link Escape (DLE) codes will be processed or ignored. Select the YES option to ignore the codes and NO to process them. This screen will only appear when the communication protocol is STATUS4.
	Allows the selection of which interface board will be set up in subsequent menus. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for optional PCI interface cards.
	Selection of the DIPSW option will use settings on the serial interface card. The LCD option advances the operator to menus that allow the DIPSW settings to be over-written.
	Allows the selection of the receive buffer type. Select MULTI for multiple-item buffer and 1ITEM for a single item buffer. This screen will only appear if one of the serial interface types is installed and the protocol is set to READY/BUSY or XON/XOFF.
	Allows selection of the baud rate. Wil only appear when the RS422 or RS485 interface is installed and the LCD option is chosen from the prior menu.
	Allows selection of the baud rate. Will only appear when the RS232 interface is installed and the LCD option is chosen from the prior menu.
	Allows setting of the parity bit for the serial interface. Will not display if the dipswitch priority option is chosen. The interface board must be installed.
	Allows stop bit selection for the serial interface. Will not display if the dipswitch priority is chosen.
	Allows selection of the data length for serial interface. Will not display if the dipswitch priority option is chosen.

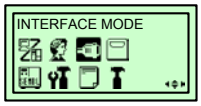
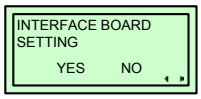
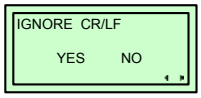
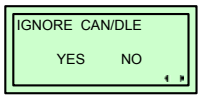
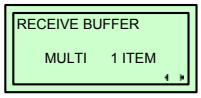
SERIAL INTERFACE MODE (TABLE 5-4)	
MENU	**DESCRIPTION**
	Allows setting of communication protocol. Will not display if the dipswitch priority option is chosen.
	Allows the item number check to be enabled or disabled. Will only appear when STATUS5 is set for the protocol.
	Allows BCC check to be enabled or disabled. Will only appear if STATUS5 is set for protocol.

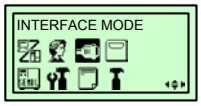
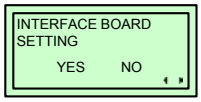
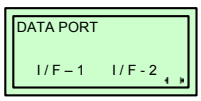
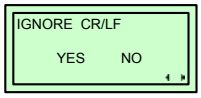
LAN INTERFACE MODE (TABLE 5-5)	
MENU	**DESCRIPTION**
	Is the premiere screen of the Interface Mode. The Interface Mode allows the parameters to be set for the printer to communicate with a host and vice-versa.
	Select the YES option to configure an interface board for bi-directional communication, the menu will advance to multiple configuration screens depending on the type of interface borad installed. Selecting the NO option will bypass those screens.
	Allows the selection of which interface port will be assigned to receive print data. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for the optional PCI interface cards.
	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all carriage returns (CR) and line feed (LF) commands in the data stream - including graphics and 2D bar codes. This feature is primarily used to maintain compatibility with earlier models of SATO printers.
	Allows the selection of which interface board will be set up in subsequent menus. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for optional PCI interface cards.
	Allows the determination of whether the Cancel (CAN) and Data Link Escape (DLE) codes will be processed or ignored. Select the YES option to ignore the codes and NO to process them. This screen will only appear when the communication protocol is STATUS4.

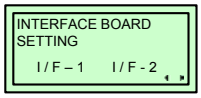
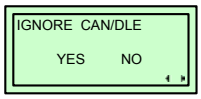
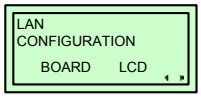
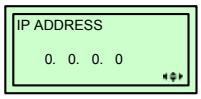
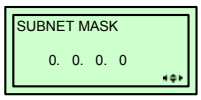
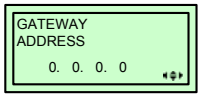
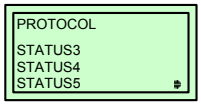
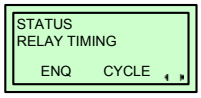
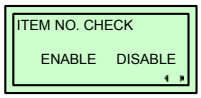
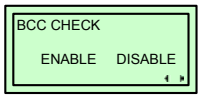
LAN INTERFACE MODE (TABLE 5-5)	
MENU	**DESCRIPTION**
	Allows the determination of whether the interface will be configured on the interface board or the LCD. This screen will only appear if the LAN, Wireless LAN, or Mini LAN interface board has been installed. Power off the printer, then on again to enable the changes.
	Sets a unique static IP Address using the TCP/IP Protocol. The format of an IP Address is a 32-bit numeric address written as four numbers separated by periods. See your network administrator for available IP Addresses.
	Specifies which segment of the network the printer will reside. The format of Subnet Mask is a 32-bit numeric address written as four numbers separated by periods. See your network administrator to find out your Subnet Mask.
	Specifies the IP Address of the main router on the host network. The format of a Gateway Address is a 32-bit numeric address written as four numbers separated by periods. See your network administrator to find out your default Gateway Address. When the priority setting is set to BOARD, this screen will not appear. Power off the printer, then on again to enable the changes.
	Allows setting of the sequence of control characters to ensure correct data transference. See your network administrator to find out which Status number will be used for the control characters being sent to and from the printer.
	Allows reply timing of status information to the host to be set. Select the ENQ option to return status after receiving Status Request (ENQ) and CYCLE to return status from the printer to the host at 500ms intervals. This screen will only appear when LAN or Wireless LAN is installed and when protocol is set to STATUS4.
	Allows the item number check to be enabled or disabled. Will only appear when STATUS5 is set for the protocol. When performing a test print of any LAN type of interface, set this to DISABLE.
	Allows BCC check to be enabled or disabled. Will only appear if STATUS5 is set for protocol. When the printer driver is set for GAP sensor printing (transmissive mode), BCC CHECK will be switched to DISABLE. When performing a test print of any LAN type of interface, set this to DISABLE.
	This menu screen shows the setting of Port Number 1 for raw data transfer.
	This menu screen shows the setting of Port Number 2 for raw data transfer.

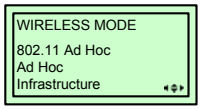
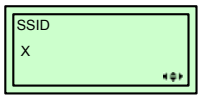
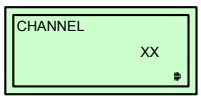
LAN INTERFACE MODE (TABLE 5-5)	
MENU	**DESCRIPTION**
	This menu screen shows the setting of Port Number 3 for raw data transfer.

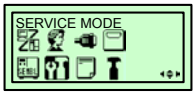
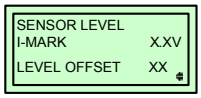
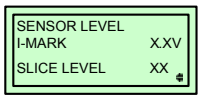
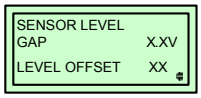
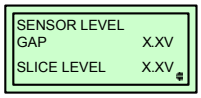
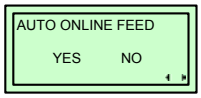
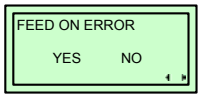
USB INTERFACE MODE (TABLE 5-6)	
MENU	**DESCRIPTION**
	Is the premiere screen of the Interface Mode. The Interface Mode allows the parameters to be set for the printer to communicate with a host and vice-versa.
	Select the YES option to configure an interface board for bi-directional communication, the menu will advance to multiple configuration screens depending on the type of interface borad installed. Selecting the NO option will bypass those screens.
	Allows the selection of which interface port will be assigned to receive print data. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for the optional PCI interface cards.
	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all carriage returns (CR) and line feed (LF) commands in the data stream - including graphics and 2D bar codes. This feature is primarily used to maintain compatibility with earlier models of SATO printers.
	Allows the determination of whether the Cancel (CAN) and Data Link Escape (DLE) codes will be processed or ignored. Select the YES option to ignore the codes and NO to process them. This screen will only appear when the communication protocol is STATUS4.
	Allows the selection of which interface board will be set up in subsequent menus. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for optional PCI interface cards.
	Allows setting of the sequence of control characters to ensure correct data transference. See your network administrator to find out which Status number will be used for the control characters being sent to and from the printer.
	Allows the item number check to be enabled or disabled. Will only appear when STATUS5 is set for the protocol.
	Allows BCC check to be enabled or disabled. Will only appear if STATUS5 is set for protocol. When the printer driver is set for GAP sensor printing (transmissive mode), BCC CHECK will be switched to DISABLE.

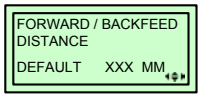
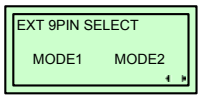
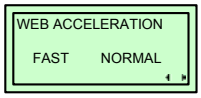
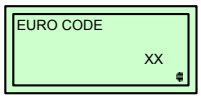
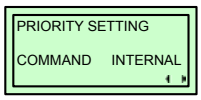
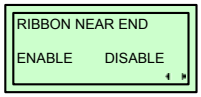
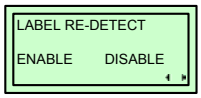
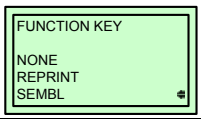
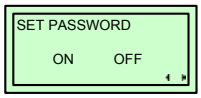
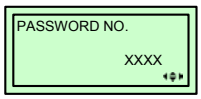
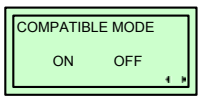
CENTRONICS INTERFACE MODE (TABLE 5-7)	
MENU	**DESCRIPTION**
	Is the premiere screen of the Interface Mode. The Interface Mode allows the parameters to be set for the printer to communicate with a host and vice-versa.
	Select the YES option to configure an interface board for bi-directional communication, the menu will advance to multiple configuration screens depending on the type of interface borad installed. Selecting the NO option will bypass those screens.
	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all carriage returns (CR) and line feed (LF) commands in the data stream - including graphics and 2D bar codes. This feature is primarily used to maintain compatibility with earlier models of SATO printers.
	Allows the determination of whether the Cancel (CAN) and Data Link Escape (DLE) codes will be processed or ignored. Select the YES option to ignore the codes and NO to process them. This screen will only appear when the communication protocol is STATUS4.
	Allows the selection of the receive buffer type. Select MULTI for multiple-item buffer and 1ITEM for a single item buffer. This screen will only appear if one of the serial interface types is installed and the protocol is set to READY/BUSY or XON/XOFF.

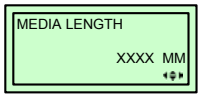
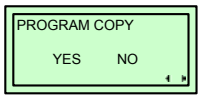
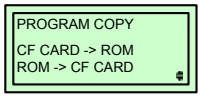
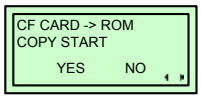
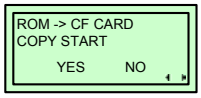
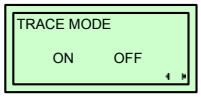
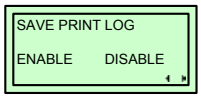
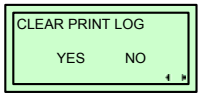
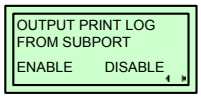
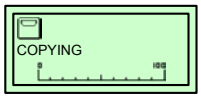
WIRELESS LAN INTERFACE MODE (TABLE 5-8)	
MENU	**DESCRIPTION**
	Is the premiere screen of the Interface Mode. The Interface Mode allows the parameters to be set for the printer to communicate with a host and vice-versa.
	Select the YES option to configure an interface board for bi-directional communication, the menu will advance to multiple configuration screens depending on the type of interface borad installed. Selecting the NO option will bypass those screens.
	Allows the selection of which interface port will be assigned to receive print data. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for the optional PCI interface cards.
	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all carriage returns (CR) and line feed (LF) commands in the data stream - including graphics and 2D bar codes. This feature is primarily used to maintain compatibility with earlier models of SATO printers.

WIRELESS LAN INTERFACE MODE (TABLE 5-8)	
MENU	**DESCRIPTION**
	Allows the selection of which interface board will be set up in subsequent menus. Interface Port 1 (I/F-1) is the smaller card slot of the printer and Interface Port 2 (I/F-2) is the printer's middle card slot. The default setting is I/F-2 and accommodates a standard interface card. I/F-1 is to be used for optional PCI interface cards.
	Allows the determination of whether the Cancel (CAN) and Data Link Escape (DLE) codes will be processed or ignored. Select the YES option to ignore the codes and NO to process them. This screen will only appear when the communication protocol is STATUS4.
	Allows the determination of whether the interface will be configured on the interface board or the LCD. This screen will only appear if the LAN, Wireless LAN, or Mini LAN interface board has been installed. Power off the printer, then on again to enable the changes.
	Sets a unique static IP Address using the TCP/IP Protocol. The format of an IP Address is a 32-bit numeric address written as four numbers separated by periods. See your network administrator for available IP Addresses.
	Specifies which segment of the network the printer will reside. The format of Subnet Mask is a 32-bit numeric address written as four numbers separated by periods. See your network administrator to find out your Subnet Mask.
	Specifies the IP Address of the main router on the host network. The format of a Gateway Address is a 32-bit numeric address written as four numbers separated by periods. See your network administrator to find out your default Gateway Address. When the priority setting is set to BOARD, this screen will not appear. Power off the printer, then on again to enable the changes.
	Allows setting of the sequence of control characters to ensure correct data transference. See your network administrator to find out which Status number will be used for the control characters being sent to and from the printer.
	Allows reply timing of status information to the host to be set. Select the ENQ option to return status after receiving Status Request (ENQ) and CYCLE to return status from the printer to the host at 500ms intervals. This screen will only appear when LAN or Wireless LAN is installed and when protocol is set to STATUS4.
	Allows the item number check to be enabled or disabled. Will only appear when STATUS5 is set for the protocol. When performing a test print of any LAN type of interface, set this to DISABLE.
	Allows BCC check to be enabled or disabled. Will only appear if STATUS5 is set for protocol. When the printer driver is set for GAP sensor printing (transmissive mode), BCC CHECK will be switched to DISABLE. When performing a test print of any LAN type of interface, set this to DISABLE.

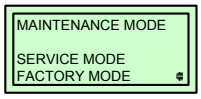
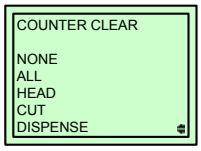
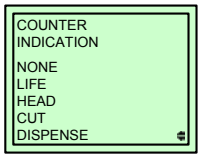
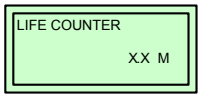
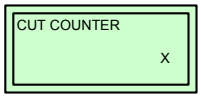
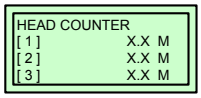
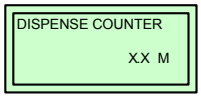
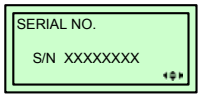
WIRELESS LAN INTERFACE MODE (TABLE 5-8)	
MENU	**DESCRIPTION**
	This menu screen allows for the setting of the wireless LAN communication method. See your network administrator for the proper setting.
	Allows the unique wireless LAN SSID name to be configured in the printer. See your network administrator for proper SSID settings.
	Allows the wireless LAN channel to be set in the printer. The valid range is 01 to 14. See your network administrator for the wirelss network channel.

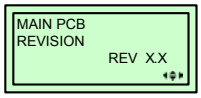
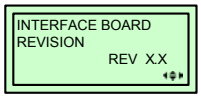
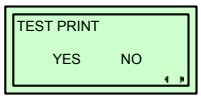
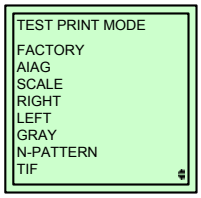
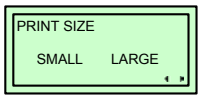
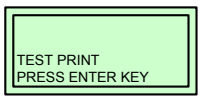
SERVICE MODE (TABLE 5-9)	
MENU	**DESCRIPTION**
	The Service Mode allows the programming of various dimensional settings, sensor thresholds, and language options.
	Permits sensitivity adjustment of the eye-mark sensor. The adjustment range is 1 to 99. The default value is 50.
	Permits adjustment of the sensor's slice level. The slice level is the voltage at which the printer determines media change from label to gap and vice-versa. A setting of 0.0 to 3.2 volts is possible. The default is 1.4 volts. A setting of 0.0 volts causes the printer to automatically determine the slice level.
	Allows sensitivity adjustment of the gap sensor for different label materials. Increasing/ decreasing the level offset changes the sensor's voltage value within a factory set range. The adjustment range is 1 to 99. The default value is 50. Refer to the Adjustment Procedures unit of this manual for detailed instructions.
	Allows the sensor threshold (slice level) adjustment of the gap sensor. Ideally, the slice level setting is at or near the mid-point between the low and high voltage readings from the previous screen ((low voltage reading + high voltage reading)/2 = slice level setting). A setting of 0.0 to 3.2 volts is possible. The default value is 1.2 volts. A setting of 0.0 volts causes the printer to automatically determine the slice level.
	This feature allows one label to be fed upon the printer entering the online mode. Enable or disable as desired.
	Allows it to be determined if the printer will feed a label when an error condition is cleared and the printer goes online.

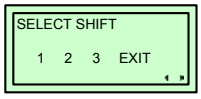
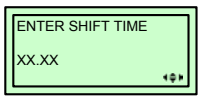
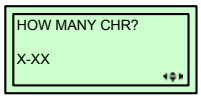
SERVICE MODE (TABLE 5-9)	
MENU	**DESCRIPTION**
	Allows the establishment of a specific distance the media will be advanced and retracted in addition to distance set by the OFFSET potentiometer on the operator panel. If using thermal transfer for printing, set the feed distance less than 30mm to avoid detection of the ribbon end by accident.
	Allows selection of output mode options. MODE1 outputs signal in the status of existence/non-existence for the number of remaining labels to be printed. MODE2 outputs signal in the status of online/offline.
	Allows the printer to use either a NORMAL or FAST web acceleration. Large, heavy label rolls should use the NORMAL option while smaller, lighter rolls can use the FAST option.
	Allows the hexadecimal code to be specified for the character replaced with the Euro Character. The default is D5H.
	Allows the user to assign a method of command priority. Where programming instructions conflict, the printer will allow this assignment to take priority. This priority assignment affects the settings for print darkness, print speed, start position correction, operation mode, print method, and sensor types.
	Select the ENABLE option to set the printer to automatically notify when ribbon supply is nearly exhausted.
	Select ENABLE to allow the printer to redetect label pitch after the printer has been turned on after having the print head open. When DISABLE is selected, label pitch will not be redetect and the label must be manually positioned.
	Allows the assignment of a function to the Function key. The NONE setting disables the button. It may also be assigned the REPRINT command or to enter the SEMBL mode.
	Permits the determination of whether a password will be required to access and change principle configuration features.
	Permits the assignment of a password. Use the vertical arrow keys of the operator panel to scroll digit options and the horizontal arrow keys to move from one digit location to another. Press the Enter key to record the four-digit password chosen.
	Determines whether or not the printer will be compatible with a previous printer model. When the Compatibility Mode is ON, the functions and settings that are unique to the printer will be disabled or modified to match the characteristics of older printer models of the same family. This allows legacy or custom-programmed labeling software to run on this printer without requiring modification.

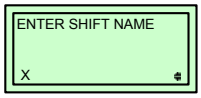
SERVICE MODE (TABLE 5-9)	
MENU	**DESCRIPTION**
	Allows the maximum length of the label used to be defined. The default value varies depending on head density: 8dot/mm = 0 to 2500mm, 12dot/mm = 0 to 1500mm, 24dot/mm = 0 to 400mm. This screen will not appear if the Comaptibility Mode has been turned ON.
	Allows the determination of copying firmware data to and from the ROM and optional CF Card. The default setting is NO, meaning that copying is not desired.
	Appears if the YES option was chosen on the preceding screen and allows the direction of information flow to determined.
	This screen confirms the selection from the preceding screen and allows the option of initiating the copy or to abort.
	This screen confirms the selection from the preceding screen and allows the option of initiating the copy or to abort.
	If Trace Mode is enabled, three different icons will appear on the LCD to trace the processing of a label. The first identifies data reception, the second displays after receiving <ESC>A (1BH), and the third displays following a print operation.
	Permits determination of whether a record of print activity will be maintained on the CF Card.
	Allows the record of print activity to be cleared if a log has been maintained.
	Allows the print log to be output to the printer's sub-port (port not used for print data) in real time. The default is DISABLE. By default, the I/F-2 card is set to be a sub-port for status monitoring purposes only. The main I/F card is by default the data port for printing purposes. However, the roles of those two slots may be exchanged at the DATA PORT menu screen.
	Screen confirms that copying is in process and displays its progress status. A tinted field will move laterally from the left toward the right as copying progresses. When the tinted bar reaches 100 on the scale, copying is complete.
	This screen confirms the completion of the copy process and prompts for action to exit the program.

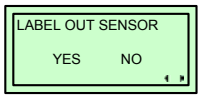
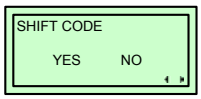
SERVICE MODE (TABLE 5-9)	
MENU	**DESCRIPTION**
	Allows the language of the menu screens to be selected.

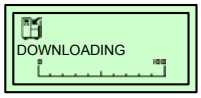
FACTORY MODE (TABLE 5-10)	
MENU	**DESCRIPTION**
	Is the first menu screen of the Maintenance Mode that includes the Service Mode and Factory Mode. Provides a prompt on the action required to proceed to the Factory Mode.
	Counter Clear permits the operator to select individual counters to be reset to zero or by selecting ALL, to entirely clear all of the printer's internal counters or EEPROM data.
	Allows view of the recorded linear meters of printed media by the printer's internal counters.
	Is an informational screen that provides the length of media used since printer setup.
	Enables view of the printer's cutter counter identifying the quantity of cut cycles by that cutter.
	Is an informational screen that provides the printed length of media using the existing print head. The head counter should be reset each time the print head is replaced.
	Enables view of the printer's dispense counter identifying the quantity of times the printer has dispensed a label.
	Enables the printer's serial number to be recorded within its memory.

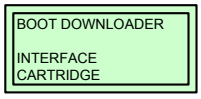
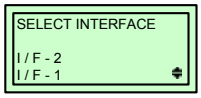
FACTORY MODE (TABLE 5-10)	
MENU	**DESCRIPTION**
	Enables the revision number of the main circuit board to be recorded within its memory.
	Enables the revision number of the interface board to be recorded within its memory.
	Allows the determination of whether to test print or not.
	If the YES option is selected from the previous screen, this menu allows the test print type to be selected.
	Allows the selection of large (10cm) or small (4cm) media width. These are the only two options.
	Initiates test printing activity.

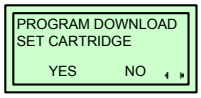
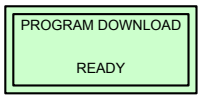
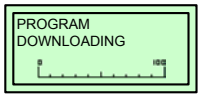
WORK SHIFT MODE (TABLE 5-11)	
MENU	**DESCRIPTION**
	This screen is used to select the shift that will be configured in the screens to follow. Up to three shifts can be configured. Note the shift code must be installed from within the Hidden Mode (below) to access the Work Shift Mode.
	Permits the entry of the begin time of the shift being configured. This is in a 24 hour clock format.
	Allows the establishment of the quantity of character to be used for the Shift Name in the screen to follow. The first X depicts the shift number and is based upon what was selected in the Select Shift screen. The XX has a valid range of 1 to 16.

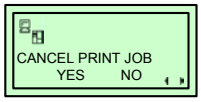
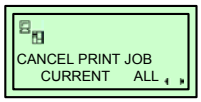
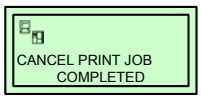
WORK SHIFT MODE (TABLE 5-11)	
MENU	**DESCRIPTION**
	Allows the entry of the user defined shift name. The quantity of characters used must be reflective of the quantity entered in the preceding screen.

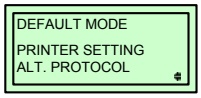
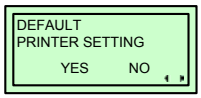
HIDDEN MODE (TABLE 5-12)	
MENU	**DESCRIPTION**
	Used to enable or disable the label out sensor. The YES option is enabled and the NO option is disabled.
	Used to enable or disable the Shift Code menu parameters. The YES option is enabled and the NO option is disabled. Note the YES option must be selected to access the Work Shift Mode menu.

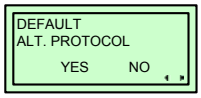
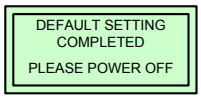
DOWNLOAD MODE (TABLE 5-13)	
MENU	**DESCRIPTION**
	Is an informational screen only and confirms that the printer is ready to receive the data.
	Screen confirms that downloading is in process and displays its progress status. A tinted field will move laterally from the left toward the right as downloading progresses. When the tinted bar reaches 100 on the scale, downloading is complete.
	This menu screen appears when all of the data has been received and the process is complete.

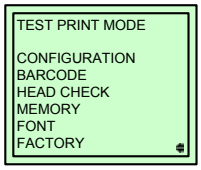
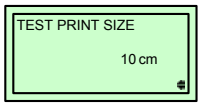
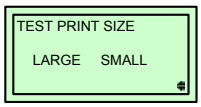
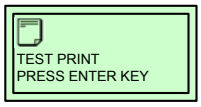
BOOT DOWNLOAD MODE (TABLE 5-14)	
MENU	**DESCRIPTION**
	Allows the selection of location of download, via the INTERFACE or CF Card.
	Permits the sub-port to be used for the download process. The I/F-1 port is for the PCI interface type and I/F-2 is the standard interface type. This screen only appears if INTERFACE was selected in the first screen.

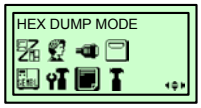
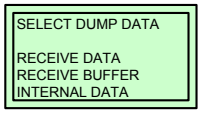
BOOT DOWNLOAD MODE (TABLE 5-14)	
MENU	**DESCRIPTION**
	This screen only appears if CARTRIDGE was selected in the first screen and prompts to confirm that the CF Card has been installed and setup for use.
	Confirms theprinter is on standby for receiving data.
	Screen confirms that downloading is in process and displays its progress status. A tinted field will move laterally from the left toward the right as downloading progresses. When the tinted bar reaches 100 on the scale, downloading is complete.
	This menu screen appears when all of the data has been received and the process is complete. Also prompts the operator on how to proceed.

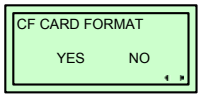
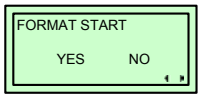
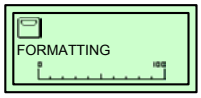
PRINT CANCEL MODE (TABLE 5-15)	
MENU	**DESCRIPTION**
	Print data that has been previously received, can be cleared. If the YES option is selected, the print data will be deleted and then the printer will go offline. If the NO option is selected, the printer will go offline without deleting data.
	This menu screen allows the selection of whether to only delete the current print job or all that have been received.
	This screen confirms the received data has been deleted. Will display for 3 seconds, then the printer will go offline.

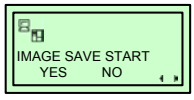
DEFAULT SETTING MODE (TABLE 5-16)	
MENU	**DESCRIPTION**
	Is the first menu screen of the printer's Default Setting Mode. The Default Setting Mode allows the printer to be reset to the programmed condition as received from the factory. This may include all printer settings or just protocol.
	The selection of YES confirms the operator wants to proceed and the selection of NO allows for exit without default reset. If YES is selected, resetting will immediately begin. This screen will only appear if PRINTER SETTING was selected from the first screen.

DEFAULT SETTING MODE (TABLE 5-16)	
MENU	**DESCRIPTION**
	The selection of YES confirms the operator wants to proceed and the selection of NO allows for exit without default reset. If YES is selected, resetting will immediately begin. This screen will only appear if ALT. PROTOCOL was selected from the first screen.
	Is an informational screen only indicating that reset activity is complete.

TEST PRINT MODE (TABLE 5-17)	
MENU	**DESCRIPTION**
	Is the initial screen of the Test Print Mode. • **CONFIGURATION:** The printer's configuration settings. • **BARCODE:** The printer's installed barcodes. • **HEAD CHECK:** A pattern to check print head elements. • **MEMORY:** The printer's internal memory. • **FONT:** The contents of the installed fonts. • **FACTORY:** A factory test label will be printed.
	This menu screen only appears if CONFIGURATION, BARCODE, or HEAD CHECK was chosen in the previous menu. The increments of measure is 1cm.
	For factory test prints, this screen appears instead of the previous screen for setting print size. Large (10cm) and small (4cm) are the only two options.
	Is a directional screen prompting action on how to terminate print activity. Press FEED to stop printing and press again to resume printing. If the external signal is enabled, the test print must be initiated with a print start signal via the EXT port.

HEX DUMP MODE (TABLE 5-18)	
MENU	**DESCRIPTION**
	Is the premiere screen to the Hex Dump Mode. The contents of the print buffer and the data received before it is placed into the print buffer may be examined through the use of the Hex Dump Mode. Each line of the printed data is enumerated in the first column, the second column contains the data in hexadecimal format, and the right column contains the same data in ASCII format.
	Only one type of data will be printed at a time. This screen allows the selection of the data to be printed. Repeat the Hex Dump process to print the other data types if required. The INTERNAL DATA option allows the printing of setting for the internal buffer.

CF (COMPACT FLASH) CARD MODE (TABLE 5-19)	
MENU	**DESCRIPTION**
	Is the premiere screen of the CF Card Mode. The Card Mode allows management of the optional Compact Flash Card.
	Allows the determination of formatting the flash card. Select the YES option to advance to the formatting screens. Select the NO option to return to the first screen of the CF Card Mode.
	This menu screen initiates the formatting process when selecting the YES option. Select the NO option to return to the first screen of the CF Card Mode.
	Screen confirms that formatting is in process and displays its progress status. A tinted field will move laterally from the left toward the right as formatting progresses. When the tinted bar reaches 100 on the scale, formatting is complete.
	Confirms that formatting has completed and prompts for action to exit the CF Card Mode.

STAND ALONE MODE (TABLE 5-20)	
MENU	**DESCRIPTION**
	Allows a previously sent data item to be saved. If the YES option is chosen, an image is saved to the Flash Card. If NO, is chosen, an image is not saved. Only a single image may be saved at a time and will be overwritten by a new image.
	Allows the data saved in the Flash Card to be read and to specify the print quantity. Use the arrow keys to change the print quantity, then press ENTER. The print will beep if print data is not stored.

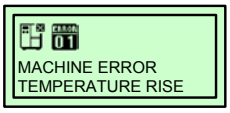
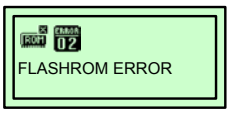
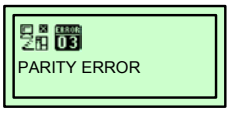
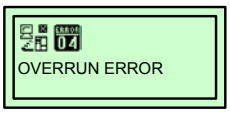
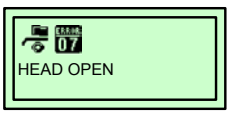
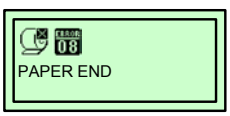
6

TROUBLESHOOTING

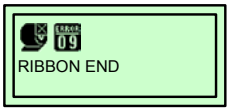
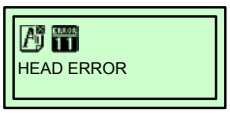
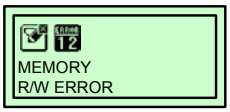
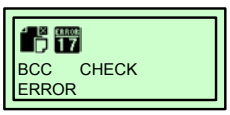
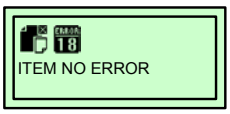
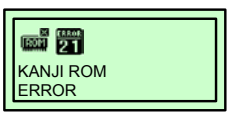
- **Error Signal Troubleshooting**
- **Warning Signal Troubleshooting**
- **Troubleshooting Table**
- **Interface Troubleshooting**
- **Performance Testing**
- **Test Print Modes**

ERROR SIGNAL TROUBLESHOOTING

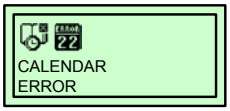
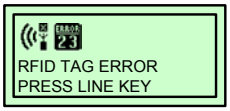
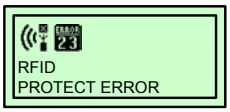
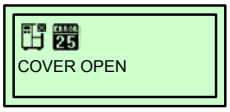
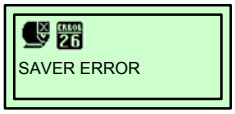
ERROR DISPLAYS

ERROR	LED DISPLAY	LCD DISPLAY	DESCRIPTION
01 Machine Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure all wiring harnesses are properly connected. 2. Replace main circuit board as necessary.
02 Machine Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure work environment does not exceed specification. 2. Ensure fan filter is not clogged. Replace as necessary. 3. Ensure internal fan is operational. Replace as necessary. 4. Replace main circuit board as necessary.
03 Flash ROM Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure correct communication protocols. 2. Check cables, cycle printer power and resend. 3. Replace board as necessary.
04 Parity Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Ensure correct communication parameters. 2. Check cables, cycle printer power and resend. 3. Replace board as necessary.
05 Overrun Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Check and correct communication cables and settings.
06 Framing Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Ensure host system and interface settings match. 2. Check and correct communication cables. (null modem serial cable required)
07 Buffer Overflow Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Size of received data exceeds size of receiving buffer. 2. Establish the correct communication protocol.
08 Head Open Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Properly latch the print head. 2. Replace the head-open switch.
09 Paper End Error	POWER: On ONLINE: Off LABEL: Off RIBBON: On		1. Ensure media is properly loaded. 2. Clean sensor transmit/receive surfaces. 3. Ensure correct sensor configuration.

ERROR DISPLAYS

ERROR	LED DISPLAY	LCD DISPLAY	DESCRIPTION
10 Ribbon End Error	POWER: On ONLINE: Off LABEL: Off RIBBON: On		1. Ensure ribbon stock is properly loaded. 2. Ensure ribbon has not been damaged. 3. Ensure proper printer configuration.
11 Sensor Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure media is properly loaded. 2. Clean sensor transmit/receive surfaces. 3. Ensure correct sensor configuration. 4. Replace sensor as necessary.
12 Head Related Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Clean the print head's contact surface. 2. Replace the print head.
13 Memory Reading Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure CF Card is properly installed. 2. Format CF Card.
14 Memory Full Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Delete unnecessary data from flash card. 2. Ensure proper download data size.
15 Download Data Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure proper download data size.
16 BCC Check Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Ensure correct send data and communication settings.
17 Item Number Error	POWER: On ONLINE: Blink LABEL: Off RIBBON: Off		1. Ensure correct send data and communication settings.
18 Head Mismatch Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure correct print head installation. 2. Ensure correct printer configuration for print head.
19 Kanji ROM Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure correct Kanji ROM installation. 2. Replace the board as necessary.

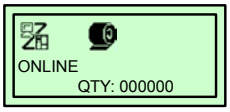
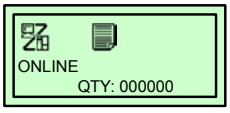
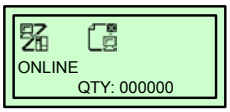
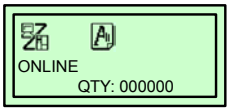
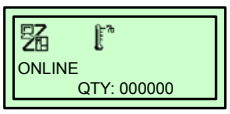
ERROR DISPLAYS

ERROR	LED DISPLAY	LCD DISPLAY	DESCRIPTION
20 Calendar Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Power off the printer to release the error. 2. Reinstall the calendar chip. 3. Replace the main circuit board as necessary.
21 RFID Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Write another RFID tag. 2. Ensure proper RFID setup/installation.
	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Press the LINE key to clear. 2. Write another RFID tag. 3. Ensure proper RFID setup/installation.
	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Write another RFID tag. 2. Ensure proper RFID setup/installation.
22 Cover Open Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Ensure the cover is completely closed. 2. Ensure the cover-open switch is properly positioned. 3. Replace the switch as necessary.
23 Saver Error	POWER: On ONLINE: Off LABEL: Off RIBBON: Off		1. Reset the head stop position.

ERROR ICONS		
LCD ICONS	**DESCRIPTION OF ERROR**	**POSITION ON LCD**
	Displayed when detecting Label End.	Icon 1
	Displayed when detecting Ribbon End.	Icon 1
	Displayed when detecting Sensor Error.	Icon 1
	Displayed when detecting Head Open.	Icon 1
	Displayed when head is disconnected.	Icon 1
	Displayed when detecting Communication Error.	Icon 1
	Displayed when detecting Receive Buffer Over.	Icon 1
	Displayed when detecting Item No. Error or BCC Error.	Icon 1
	Displayed when having access error to CF (Compact Flash) Card.	Icon 1
	Displayed when having write error to main ROM or when detecting Kanji ROM error.	Icon 1
	Displayed when detecting Calendar Error.	Icon 1
	Displayed when having a write error to RFID tag.	Icon 1
	Displayed when printer error other than above is detected.	Icon 1
	Displayed error number corresponding to various errors.	Icon 2

WARNING SIGNAL TROUBLESHOOTING

WARNING DISPLAYS

WARNING	LED DISPLAY	LCD DISPLAY	DESCRIPTION
01 Ribbon Near-End Warning	POWER: On ONLINE: On LABEL: Off RIBBON: Blink		1. Limited ribbon quantity remaining. 2. Monitor and reload before all is used.
02 Receive Buffer Near-Full Warning	POWER: On ONLINE: On LABEL: Off RIBBON: Off		1. Little receive buffer capacity remaining. 2. Cease data transmission until existing data is analyzed.
03 Command Warning	POWER: On ONLINE: On LABEL: Off RIBBON: Off		1. Review print data for command error.
04 Head Error Warning	POWER: On ONLINE: On LABEL: Off RIBBON: Off		1. Ensure print head is connected. 2. Replace print head.
05 Overheat Warning	POWER: On ONLINE: On LABEL: Blink RIBBON: Blink		1. Ensure work enviroment does not exceed specifications. 2. Ensure fan filter is not clogged. Replace as necessary. 3. Ensure internal fan is operational. Replace as necessary. 4. Replace main circuit board as necessary.

WARNING ICONS

ICON	DESCRIPTION	POSITION ON LCD
	Displayed when detecting Ribbon Near End.	Icon 3 to 5
	Displayed when detecting Buffer Near Full.	Icon 3 to 5
	Displayed when detecting Command Error.	Icon 3 to 5
	Displayed when head is disconnected.	Icon 3 to 5
	Displayed when the printer's internal temperature exceeds 85 degrees C.	Icon 3 to 5

TROUBLESHOOTING TABLE

TROUBLESHOOTING TABLE	
IMAGE VOIDS	
Dirty print head.	Clean print head.
Damaged print head.	Replace print head.
Damaged electronics.	Replace circuit board.
Damaged or worn roller.	Replace rollers.
Poor label quality.	Use higher quality media.
Ribbon stock and media are mismatched.	Consult with media supplier.
RIBBON WRINKLING	
Poor head alignment.	Adjust head balance and alignment.
Excessive temperature setting	Adjust temperature.
Poor ribbon tension.	Adjust tension as required.
Worn roller.	Replace as necessary.
Foreign material on print head and/or rollers.	Clean as required.
Foreign material on labels.	Use higher quality media.
Damaged print head.	Replace print head as required.
LIGHT PRINT IMAGES	
Low print head energy/darkness.	Adjust darkness level.
Low print head pressure.	Adjust head pressure and/or balance.
Foreign material on print head.	Clean print head and rollers.
Improper head alignment.	Align print head as required.
Excessive print speed.	Reduce print speed setting.
UNEVEN PRINT DARKNESS	
Unbalanced print head.	Adjust head balance.
Worn rollers.	Replace rollers as required.
Dirty print head.	Clean print head.
MEANDERING MEDIA	
Incorrectly loaded media.	Ensure correct loading.
Improperly adjusted media guides.	Adjust as required.
Unbalanced print head.	Adjust as required.
Worn rollers.	Replace as required.
NO LABEL MOVEMENT	
Loose or broken timing belt.	Replace or adjust as required.
Incorrect label sensor selected.	Check printer configuration for proper sensor selection.
No voltage output.	Replace fuse. Test power supply and replace as required.
Drive motor not operating.	Ensure wiring harness connection. Replace as necessary.
LCD FIELD ILLUMINATED BUT WITHOUT WORDS OR NO DISPLAY AT ALL	
Power supply issues.	Ensure cable properly connected. Check/replace power supply.
Incorrectly positioned display potentiometer.	Adjust as required.

NO PRINTED IMAGE	
Print head is disconnected.	Ensure print head wiring harness is connected on each end.
No voltage output.	Replace fuse. Test power supply and replace as required.
Defective print head.	Replace print head and reset counter.
Damaged electronics.	Replace circuit board.
Interface problems.	Troubleshoot interface - refer to the next chapter.
Data input error.	Ensure correct data stream.
Ribbon incorrectly loaded.	Ensure ribbon is properly loaded.
PRINTER CREATES A BLANK LABEL.	
Data input error.	Ensure correct data stream.
Incorrect label sensor selection.	Ensure correct printer configuration.
Disconnected print head.	Power off the printer and ensure a proper connection.
Defective print head.	Replace print head as required.
Defective main circuit board.	Replace main board as required.
INCORRECT LABEL POSITIONING.	
Incorrect label sensor selection.	Ensure correct printer configuration.
Improper sensor adjustment.	Adjust sensor sensitivity as required.
Data input error.	Ensure correct data stream.
Incorrect offset settings.	Adjust settings as required.
Incorrect applicator setup.	Refer to applicator documentation or contact manufacturer.
SMEARED PRINT IMAGES	
Poor media quality.	Use higher quality media.
Foreign material on print head and platen roller.	Clean print head and rollers.
Foreign material on labels.	Use higher quality media.
Excessive print head energy.	Adjust darkness setting.
Excessive print speed.	Adjust print speed as required.

INTERFACE TROUBLESHOOTING

This chapter provides a checklist for the various interface types. Locate the checklist relative to the interface used and perform each of the troubleshooting tasks until the problem has been isolated.

PARALLEL INTERFACE

CHK	TROUBLESHOOTING STEP
	Ensure the interface module is correctly installed. Run self-test to verify.
	Ensure the printer cable is connected to the appropriate LPT port on the host computer. If using a Windows printer driver, ensure the correct port is selected.
	Ensure a IEEE1284 printer cable is being used.
	Ensure the host's peripheral settings are set to ECP for faster throughput. Refer to the computer manufacturer's documentation for details.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem.
	Replace the interface board permanently if determined to be the problem.

RS232 SERIAL INTERFACE

CHK	TROUBLESHOOTING STEP
	Ensure the correct interface module is correctly installed. Run self-test to verify.
	Ensure the serial cable (Null Modem) meets specifications and is correctly connected at each end.
	Ensure the serial cable is not defective.
	Ensure the communication parameters for the baud rate, parity, data bits and stop bits are consistent with those being sent from the host computer.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem.
	Replace the interface board permanently if determined to be the problem.

UNIVERSAL SERIAL BUS (USB) INTERFACE

If nothing prints during a test print, verify the device drivers have been successively installed by performing the following:	
	Click on Start, Settings, and then Control Panel.
	Click on System within the new window.
	Click on the Device Manager tab.
	Ensure that the View Device By Type is checked.
	Scroll to SATO-USB Device and ensure that errors do not exist. Reinstall as required.
	Reboot the PC and the printer.
	Contact Microsoft technical support for further assistance as required.

LAN ETHERNET INTERFACE

CHK	TROUBLESHOOTING STEP
	Ensure the interface has been correctly configured. Wait two minutes and run self-test to verify. If a test label does not print, there may be a hardware problem.
	Ensure the cable and its ports are not defective.
	Ensure that a faulty print server or other protocol related scenarios are not creating a queue setup issue. Systematically perform checks and tests to isolate the cause.
	If using TCP/IP, ensure a valid IP address is specified and that all parameters are correct (subnet mask, gateway, etc.). Attempt to PING the IP address assigned to the network interface.
	If using a repeater or hub, ensure the SQE is turned off. Also ensure the repeater port is not defective by trying the print server on another port.
	Install the IPX/SPX protocol on a workstation to determine if the network device can be discovered via the MAC address. If able, configure the appropriate protocols and retest connectivity.
	Use a crossover cable to isolate the printer from the network by connecting from the interface and workstation. Verify that the parameters match on each. Test connectivity.

WIRELESS LAN INTERFACE

CHK	TROUBLESHOOTING STEP
	Ensure the interface module is correctly installed. Run self-test to verify.
	Check the signal strength by the three LED's on the interface. The more LED's are illuminated green, the stronger the signal.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Ensure the interface has been correctly configured. Wait two minutes and run self-test to verify. If a test label does not print, there may be a hardware problem.
	If using TCP/IP, ensure a valid IP address is specified and that all parameters are correct (subnet mask, gateway, etc.). Attempt to PING the IP address assigned to the network interface. Also ensure the SSID, channel, and security matches that of the network.
	Install the IPX/SPX protocol on a workstation to determine if the network device can be discovered via the MAC address. If able, configure the appropriate protocols and retest connectivity.
	Replace the interface board with another to isolate the problem.
	Replace the interface board permanently if determined to be the problem. Also reset the interface card.

CENTRONICS INTERFACE

CHK	TROUBLESHOOTING STEP
	Ensure the interface module is correctly installed. Run self-test to verify.
	Ensure the printer cable is connected to the appropriate LPT port on the host computer. If using a Windows printer driver, ensure the correct port is selected.
	Ensure the host's peripheral settings are set for Centronics output for faster throughput. Refer to the computer manufacturer's documentation for details.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem - permanently replace if defective.

PERFORMANCE TESTING

This chapter explains how to troubleshoot circuitry using a multimeter. These activities may be performed with, or without, test module assistance in conjunction with the multimeter.

MULTIMETER WITH TEST MODULE

The following procedure provides in-depth instruction on troubleshooting the DC power supply voltage. If the voltage values measure outside the specified parameters, the power board is deemed defective and must be replaced. Those relative procedures may be found in the Replacement Procedures unit of this manual.

1. Switch off the printer and open the exterior cover from the printer's mechanical side.

> NOTE: Refer to Figure 9-1a in the Addendum unit for guidance on cover opening.

2. Connect the Test Module to the available test connector on the main circuit board (Figure 6-1).
3. Connect the multimeter ground probe to the pin identified as GRD on the Test Module.
4. Connect the multimeter positive probe to the pin identified as SIG on the Test Module.
5. Switch on the printer and rotate the test module dial to the required position (Table 6-1).
6. Record the multimeter values and confirm they are within specified tolerances (Table 6-1).
7. Troubleshoot and replace components as directed in their relative procedures.

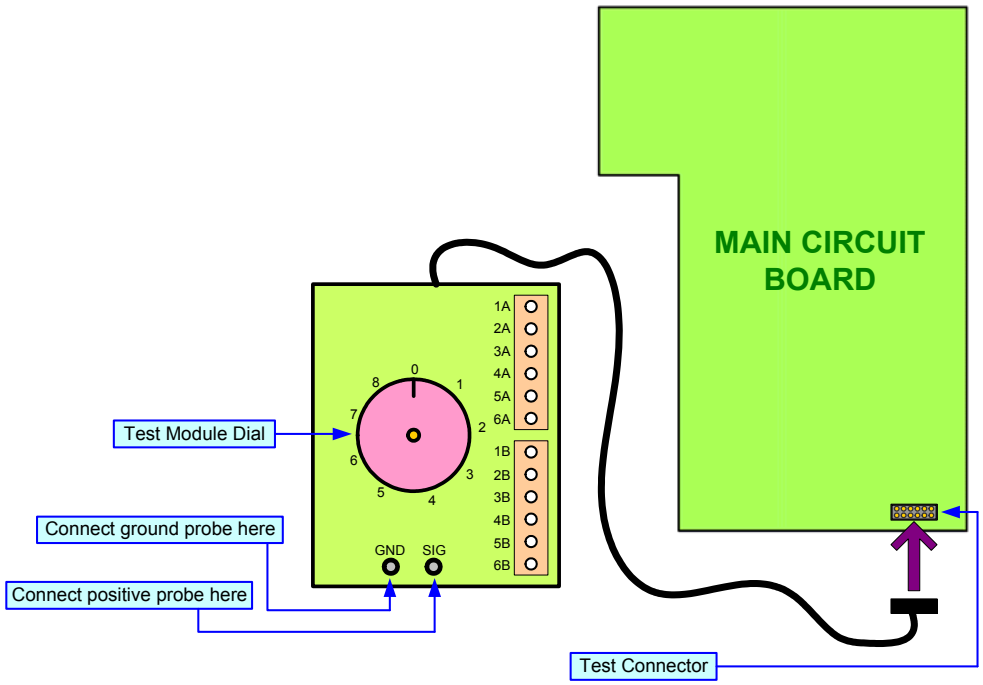
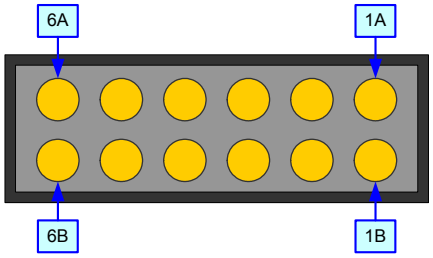


Figure 6-1, Test Module Usage



Figure, 6-2 Test Connector Pin Designation

TEST REFERENCE CHART		
MODULE DIAL	**CONNECTOR PIN**	**FUNCTION**
	1A	This connector pin is used as a ground post.
	2A	Not applicable to this printer.
0	3A	Used to determine voltage of components that require between +4.7 and +5.3 VDC to properly function.
1	4A	Used to determine voltage of components that require between +1.7 and +12.9 VDC to properly function.
2	5A	Used to determine voltage of components that require between +3.1 and +3.5 VDC to properly function.
3	6A	Used to determine voltage of components that require +24.0 VDC to properly function.
4	1B	Used in conjunction with potentiometer VR1 to set eye-mark sensor sensitivity.
5	2B	Used in conjunction with potentiometer VR2 to set gap sensor sensitivity.
6	3B	Used to test Ribbon-End sensor on the feed side (RE2). Measurement must be made while the printer is in the Maintenance Mode. If an error signal occurs, the sensor is functioning properly. If an error signal does not occur, the sensor must be replaced.
7	4B	Used to test Ribbon-End sensor on the feed side (RE1). Measurement must be made while the printer is in the Maintenance Mode. If an error signal occurs, the sensor is functioning properly. If an error signal does not occur, the sensor must be replaced.
8	5B	Not applicable to this printer.
	6B	Not applicable to this printer.

Table 6-1, Test Reference Chart

MULTIMETER ALONE

Testing of circuitry and sensor adjustment may be performed by using a multimeter without the assistance of the Test Module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Refer to the Table 6-1 to correlate the desired testing or adjustment function with its relative connector pin. Afterward, refer to Figure 6-2 to locate the required pins.

SENSOR SENSITIVITY VALUES	
SENSOR	**VALUES**
Eye-mark	Low Level: +1.0 VDC or less, High Level: low level +0.8 VDC minimum.
Gap	Low Level:+0.2 VDC to +1.0 VDC, High Level: low level +0.8 VDC minimum
Ribbon-End	Refer to Table 6-1.

TEST PRINT MODES

Chapter provides instruction on special printing to identify and resolve specific print problems.

HEX DUMP Allows the operator to determine if there were problems in the downloading of data.

TEST LABEL Allows the operator to identify specific problems regarding mechanical performance and setup.

HEX DUMP MODE

The contents of the print buffer can be examined using the Hex Dump Mode. In the left column, each line of data received is numbered. The center column provides the data in hexadecimal format. And in the right column, same data is provided in the ASC II format. Follow the flow chart provided below to perform this activity.

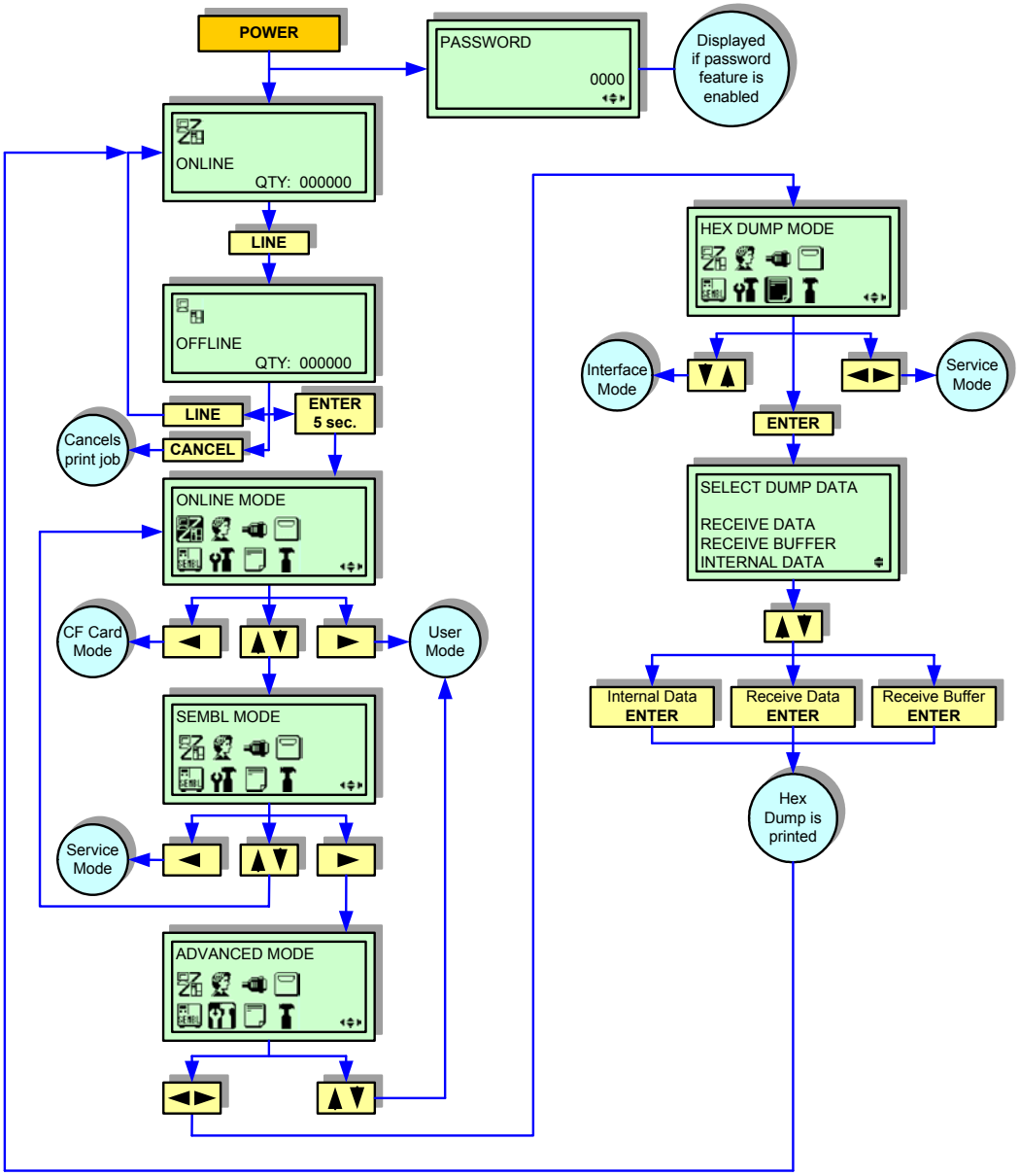


Figure 6-3, Hex Dump Mode

TEST LABEL PRINTING

The test label is designed to assist in the identification of print problems. Follow the flow chart provided below to perform this activity.

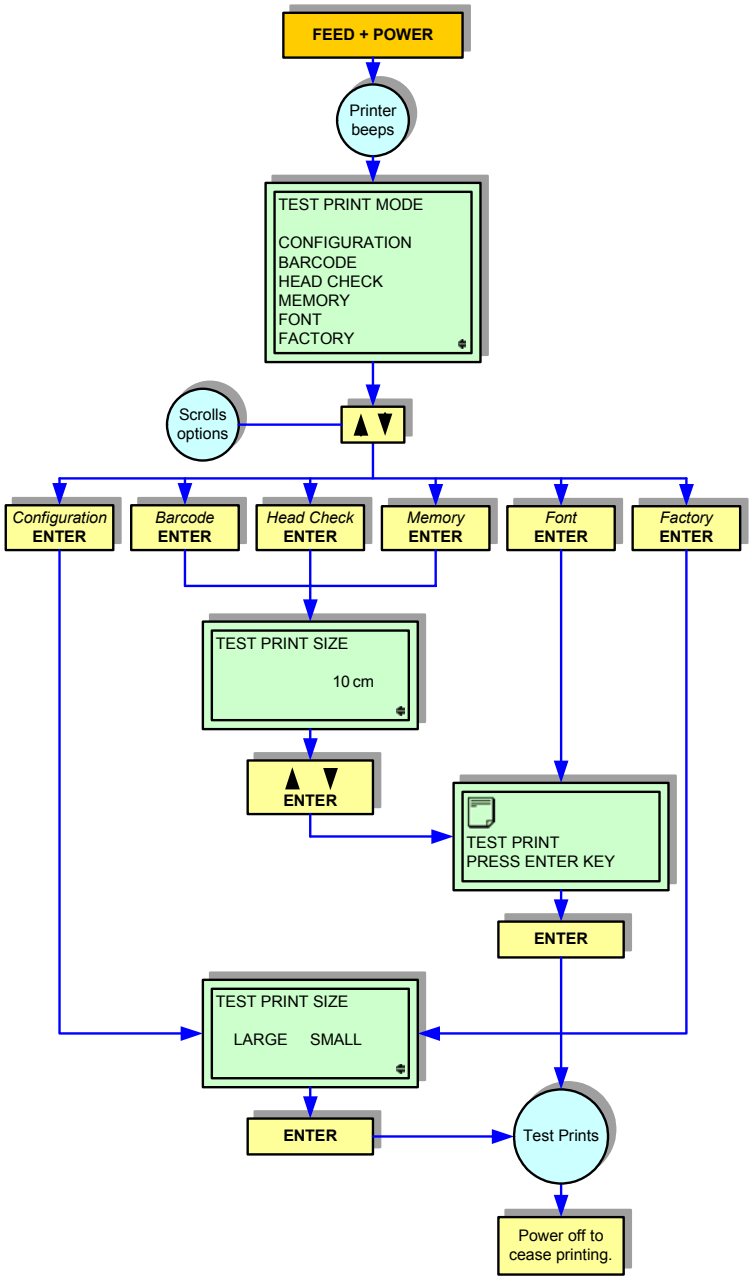


Figure 6-4, Test Print Mode

NOTE: The only print problem that the following sample test label does not display is fading of print image from one side of the label to the other. This is the result of improper print head balance.

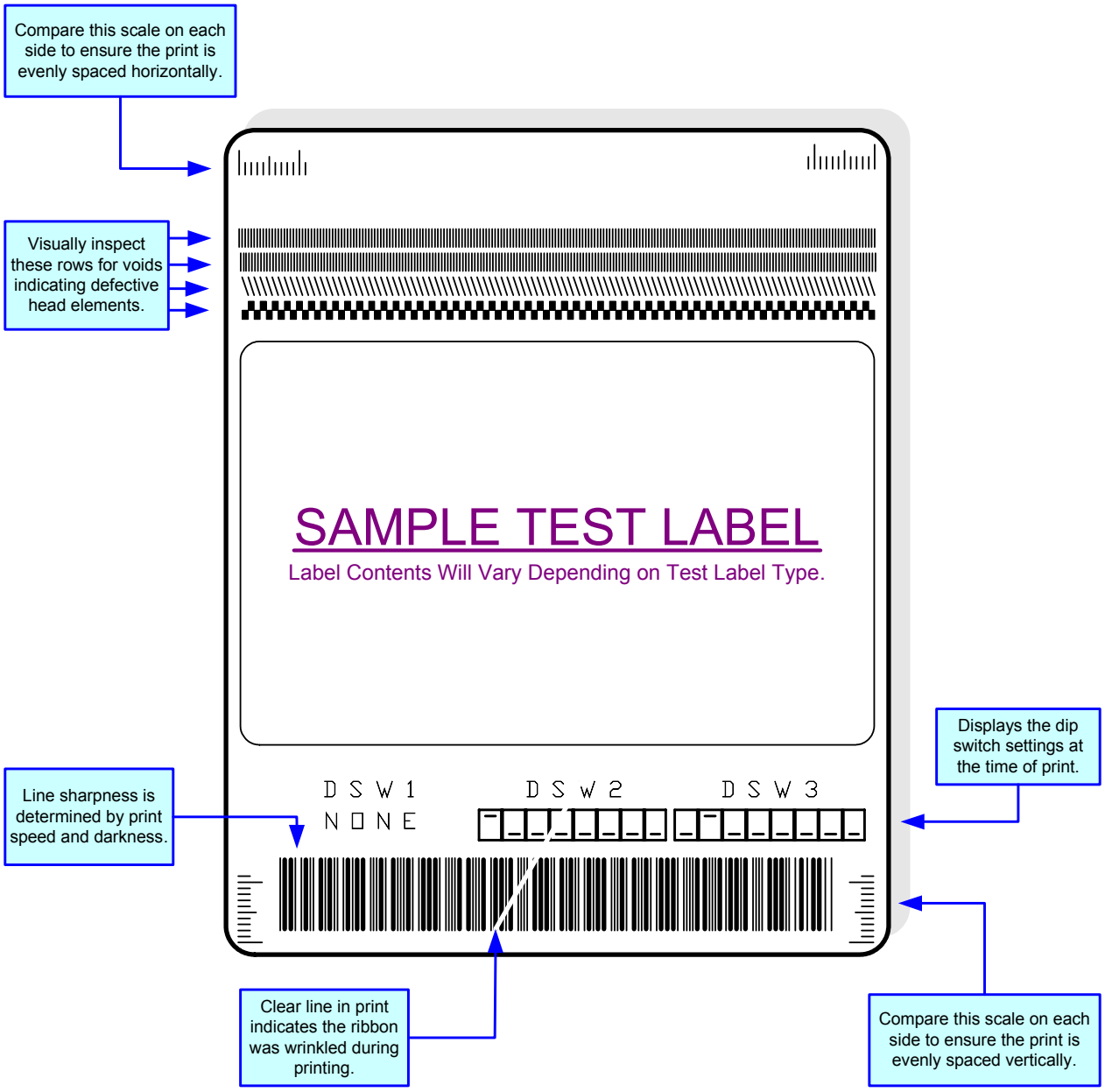

Compare this scale on each side to ensure the print is evenly spaced horizontally.
Visually inspect these rows for voids indicating defective head elements.
SAMPLE TEST LABEL
Label Contents Will Vary Depending on Test Label Type.
Displays the dip switch settings at the time of print.
Line sharpness is determined by print speed and darkness.
DSW1
NONE
DSW2
DSW3
Clear line in print indicates the ribbon was wrinkled during printing.
Compare this scale on each side to ensure the print is evenly spaced vertically.

Figure 6-5, Sample Test Label

7

REPLACEMENT PROCEDURES

- Print Head
- Platen Rollers
- Ribbon Rollers/Belt (Direct Load)
- Platen Drive Motor/Belts/Pulleys
- Ribbon Spindle Drive Motors/Belts/Pulleys
- Ribbon-Saver Drive Motor/Belt
- Ribbon Cassette Timing Belt/Rollers
- Ribbon Boss/Torque Limiter (Direct Load)
- Ribbon Boss/Torque Limiter (Cassette Load)
- Main Board
- Secondary Board
- Flash Board
- Power Board
- Panel/LCD Board
- Interface Board
- Label Sensors
- Head-Open Sensor
- Ribbon Sensors
- Ribbon-End Sensor (Direct Load)
- Ribbon-End Sensor (Cassette Load)
- Ribbon Saver Sensor
- Cover-Open Switch (Direct Load)
- Fuse
- Fan
- Fan Filter

REPLACEMENT PROCEDURES

This unit provides in-depth instruction on all primary component and assembly replacement, in addition to most secondary components. Use the text in conjunction with their accompanied graphics to ensure complete comprehension throughout the process. Especially observe all cautionary or warning notations.

> **CAUTION:** STATIC ELECTRICITY CAN RESULT IN COMPONENT DAMAGE. OBSERVE APPROPRIATE GROUNDING PROCEDURES WHEN REPLACING ANY COMPONENTS.

PRINT HEAD REPLACEMENT

If the print head becomes damaged or worn, it can be easily removed and replaced without having to make critical adjustments. Before replacing the print head, check the head counter values by printing a test pattern. Instructions relating to the Head Counter may be found in the Configuration unit of this manual.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Disengage print head latch (1, Figure 7-1) and remove ribbon stock as necessary.
3. Pull outward on print head release lever (2) to release defective print head (3) from the print assembly.
4. Disconnect the two wiring harnesses (not shown) from defective print head (3).
5. Reconnect two wiring harnesses (not shown) to replacement print head (3).

> NOTE: Each of the printer's wiring harness connectors are different from all others to ensure proper mating. Mate each matching half for reconnection.

6. Insert replacement print head (3) into the print assembly and lift upward into position until latched.

> **CAUTION:** EXCERCISE CARE WHEN INSTALLING THE PRINT HEAD TO ENSURE THAT ITS ELEMENTS ARE NOT DAMAGED DURING INSTALLATION.

7. Restore power, reload the printer, reset the head counter, and test print to ensure proper function.

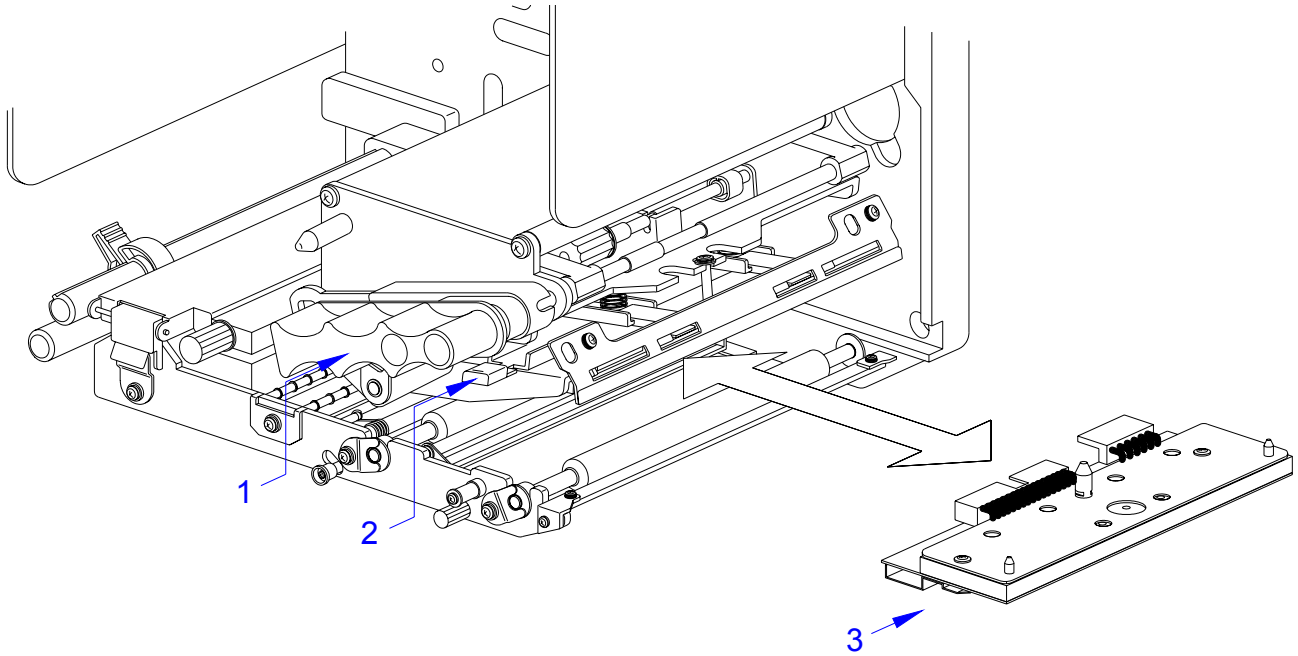


Figure 7-1, Print Head Replacement

PLATEN ROLLER REPLACEMENT

The printer's platen roller is considered to be a high-wear component due to constant treading of the print media and ribbon stock against its contact surface. This constant contact will eventually wear grooves into the rubber material and negatively effect print output. This procedure applies to all three rubber rollers.

1. Switch off the printer and observe appropriate lockout-tagout procedures.
2. Remove label media as required.
3. Loosen screw (1, Figure 7-2) sufficiently to rotate bearing clamp (2) from bearing (3).

> NOTE: Figure 7-2 shows screw (1) and bearing clamp (2) as being removed for display purposes only. It is not necessary to remove those components for roller replacement.

4. Withdraw bearing (3) from chassis (4) and worn roller (5).
5. Withdraw worn roller (5) from the printer and insert replacement roller (5) in its place.
6. Insert bearing (3) onto the free end of replacement roller (5) to nest against chassis (4).
7. Rotate bearing clamp (2) onto bearing (3) and secure screw (1).

> NOTE: Ensure the platen roller assembly is fully nested in the printer's center frame when screw (1) is secured.

8. Repeat steps 3 through 8 for other rollers as required and restore power.

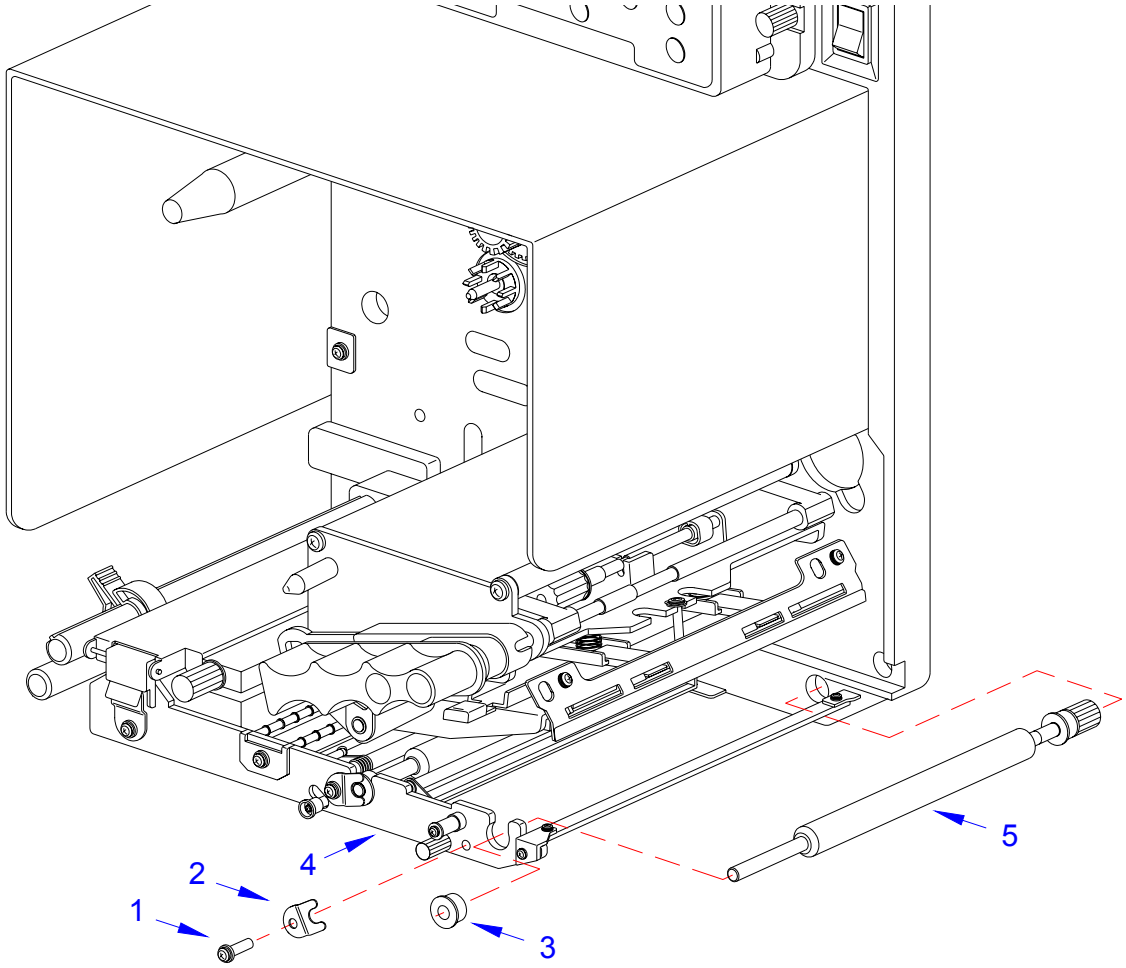


Figure 7-2, Platen Roller Replacement

RIBBON ROLLERS & BELT (DIRECT LOAD)

Following long periods of use, a belt may become worn or excessively stretched beyond the printer's adjustment ability and require replacement. It is at this time that the pulleys should be inspected for damage or wear.

1. Switch off printer and observe applicable lockout-tagout procedures.
2. Remove ribbon stock and label media from printer. Leave print head unlatched.
3. Remove screw (1, Figure 7-3a), front boss (2), torque limiter (3), pin (4), rear boss (5), and torque limiter (6) from ribbon rewind spindle (7).

> NOTE: To dismantle the ribbon spindle assembly, insert a small diameter shaft between the front and rear ribbon bosses and through an orifice in the spindle. Rotate the bosses as necessary for alignment.

4. Remove two screws (8) securing belt cover (9). Withdraw belt cover (9).
5. Remove two screws (10) securing print head latch handle (11). Withdraw latch handle (11).
6. Remove three screws (12) and two screws (13) from front plate (14). Leave front plate (14) in place.

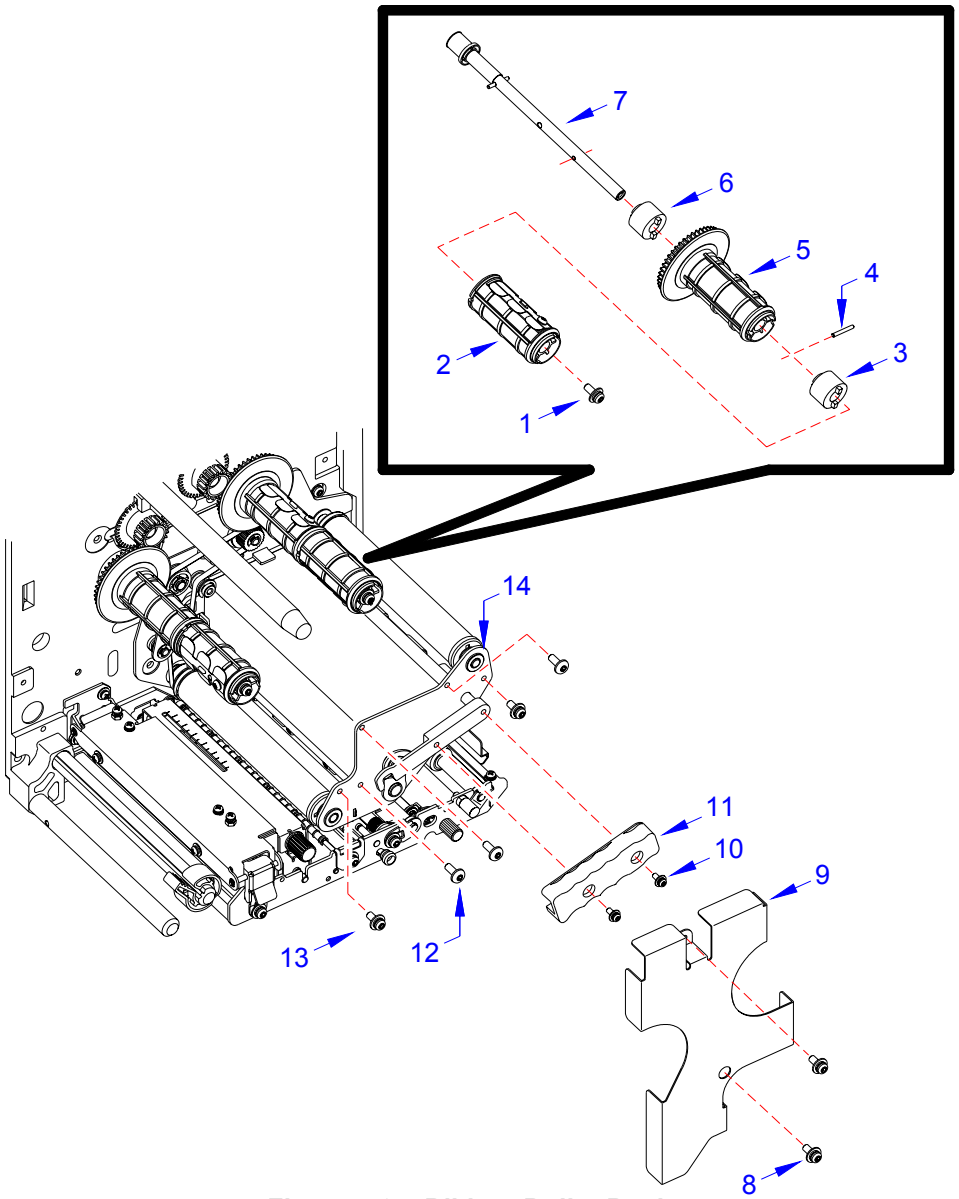


Figure 7-3a, Ribbon Roller Replacement

7. Remove one screw (15, Figure 7-3b) and two screws (16) from rear plate (17).
8. Withdraw ribbon roller assembly (18) from printer.

> NOTE: Manually hold the print head in the closed position to manipulate the roller assembly from the printer.

9. Loosen set-screw (not shown) and detach snap ring (not shown) to remove gear (19) from front roller (20).
10. Withdraw front roller (20), rear roller (21), and belt (22) from ribbon roller assembly (18).
11. Apply replacement belt (22) to replacement rear roller (21).
12. Insert replacement rear roller (21) and replacement front roller (20) into ribbon roller assembly (18).
13. Route replacement belt (22) as displayed in Figure 7-3b.
14. Apply gear (19) to front roller (20) and secure using snap ring (not shown) and set-screw (not shown).
15. Hold ribbon roller assembly (18) together while inserting into the printer, and secure two screws (16), one screw (15).

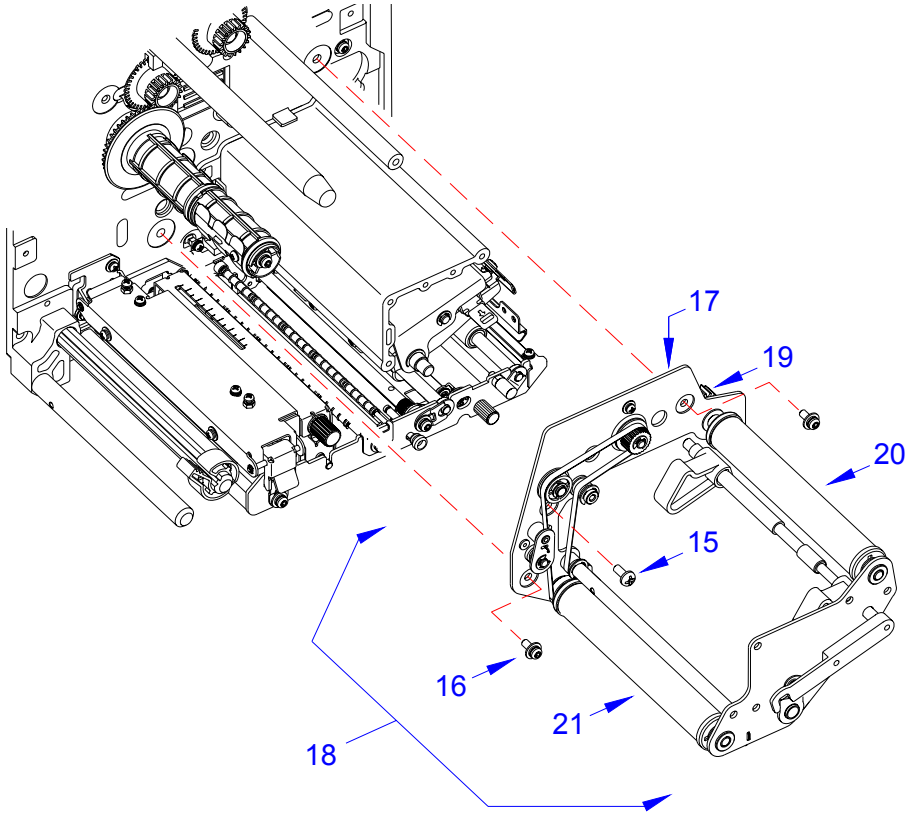


Figure 7-3b, Ribbon Roller Replacement

16. Secure front plate (14, Figure 7-3a) to the print assembly using two screws (13) and three screws (12).

> NOTE: Ensure all loose components are properly positioned before assembly.

17. Secure print head latch handle (11) to the latch using two screws (10).
18. Secure belt cover (9) to the printer using two screws (8).
19. Insert torque limiter (6), rear boss (5), pin (4), torque limiter (3), front boss (2) onto spindle (7) and secure using screw (1).
20. Reload printer, restore power, and test print to ensure correct installation.

PLATEN DRIVE MOTOR/BELT/PULLEYS REPLACEMENT

The stepper, drive motor transmits kinetic energy to the platen roller assemblies via a timing belt and gear configuration for precise print positioning and media advancement.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open rear housing covers.

> NOTE: Figure 9-1 of the Appendix unit displays housing cover opening or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (1, Figure 7-4a) and one screw (2) securing platen motor assembly (3) to frame (4).
4. Move aside five ground cables (not shown) and disconnect motor wiring harness (not shown) from secondary board (5).
5. Withdraw platen motor assembly (3) from printer frame (4).

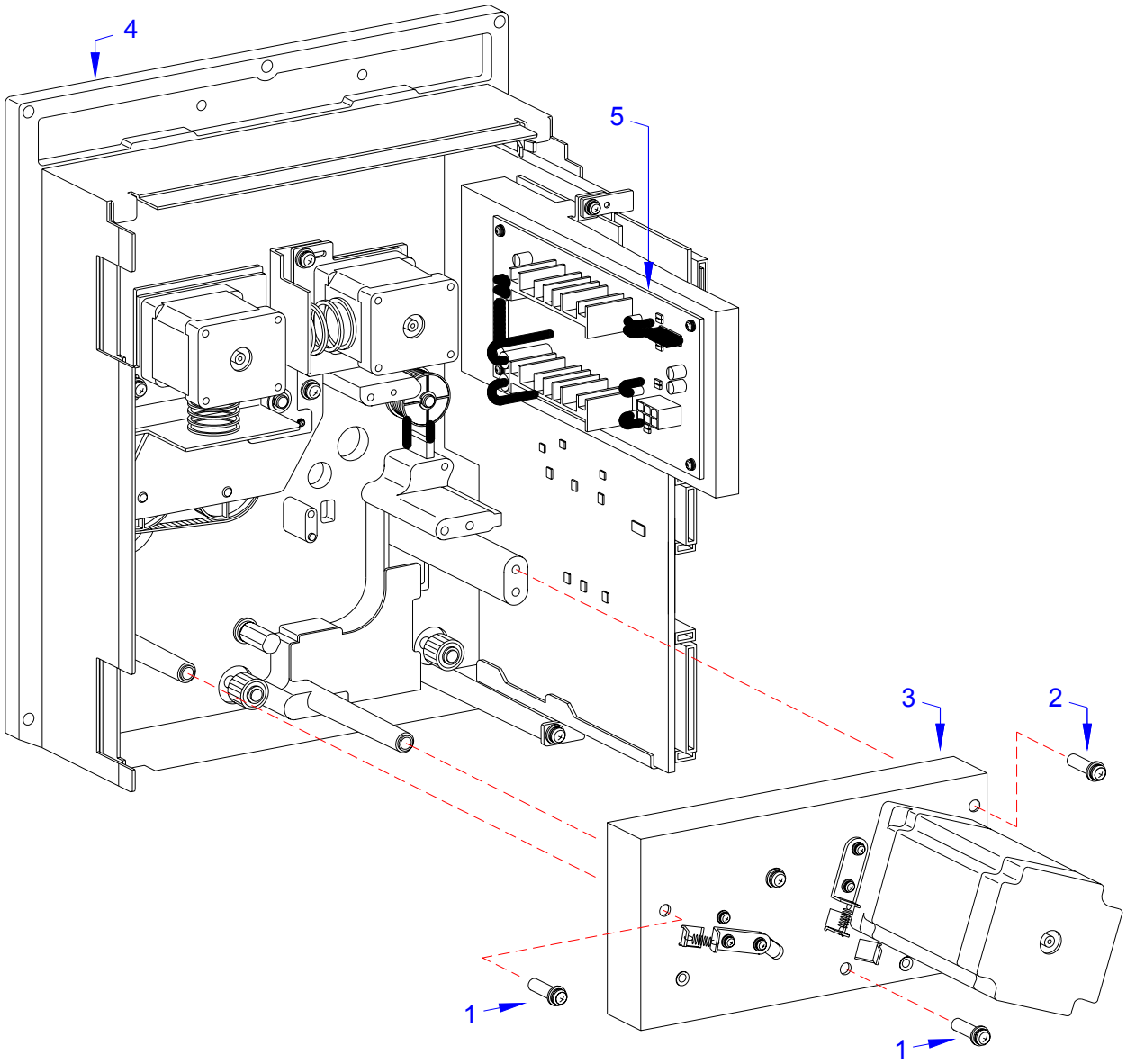


Figure 7-4a, Platen Drive Motor/Belt/Pulley Replacement

6. Remove two screws (6, Figure 7-4b) securing defective platen motor (7) to motor bracket (8).
7. Secure replacement platen motor (7) to motor bracket (8).

> NOTE: A properly installed motor will be oriented so that its spindle protrudes through its orifice in the bracket wall and its wiring harness toward its longest side.

8. Inspect and replace belts (A), (B), (C), and pulleys (not referenced) as required.

> NOTE: Detach snap ring (9) retaining any pulley to withdraw and replace.

> NOTE: The belt configuration for the S8408 printer is different from that of the S8412 and S8424. Ensure the belts are applicably configured to their respective pulleys.

> **CAUTION:** A PROPERLY TENSIONED BELT WILL BE JUST ENOUGH TO PREVENT SLIPPAGE. AN OVERLY TENSIONED BELT WILL EXCESSIVELY INCREASE DRAG ON THEIR PULLEYS AND INCREASE COMPONENT WEAR.

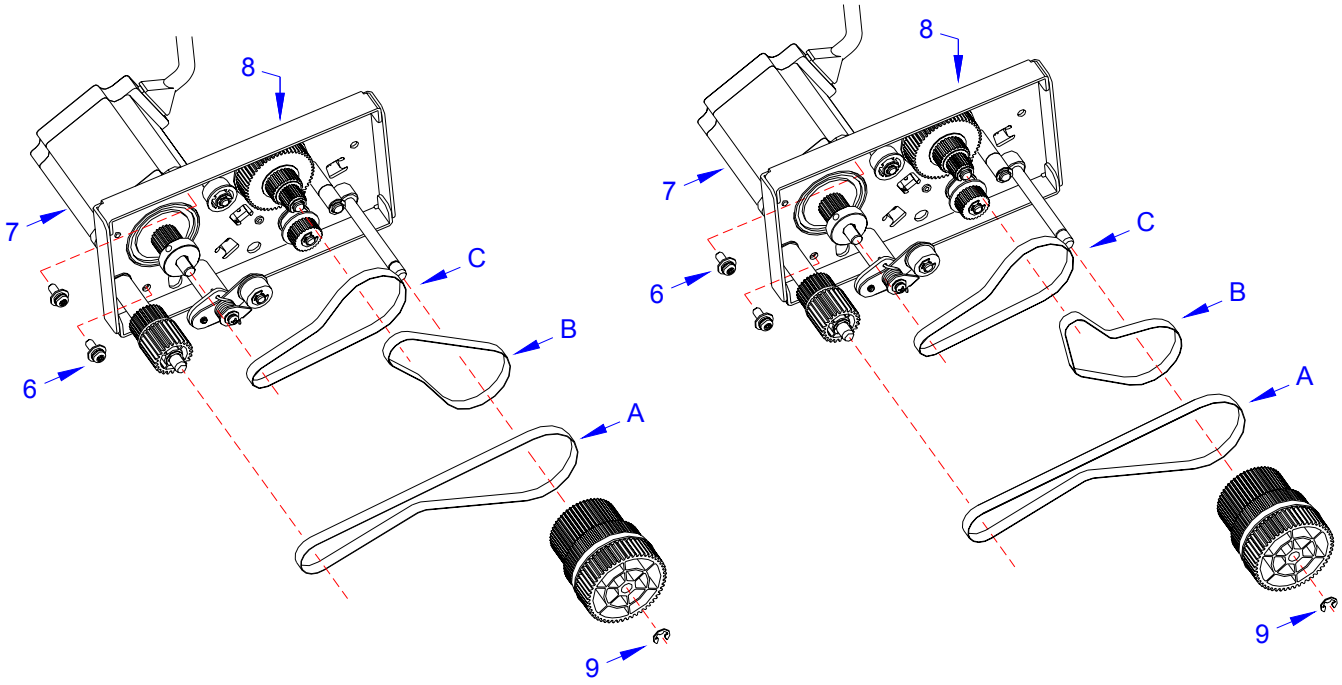


Figure 7-4b, Platen Drive Motor/Belt/Pulley Replacement

9. Insert motor assembly (3, Figure 7-4a) into printer frame (4).
10. Secure the assembly (3) and five ground cables (not shown) using one screw (2) and two screws (1).
11. Connect the motor's wiring harness (not shown) to secondary board (5).
12. Close rear housing covers, install interface cards, restore power, and test print to ensure proper function.

> NOTE: Figure 9-1 of the Appendix unit displays cover installation.

RIBBON SPINDLE DRIVE MOTORS/BELTS/PULLEYS REPLACEMENT

This printer incorporates the utilization of two drive motors; one for the ribbon supply spindle and the other for the ribbon rewind spindle. Each motor driven spindle has its own belt and pulley configuration.

For the purpose of this instruction, complete dismantling of the entire assemblies is covered. However, in most cases only partial removal may be necessary to access the damaged or worn component. In such cases, remove only the components necessary and advance in the instructions to re-assemble what has been removed.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open the rear housing covers.

> NOTE: Figure 9-1 in the Appendix unit displays cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (1, Figure 7-5a) securing motor assembly (2) to printer frame (3).
4. Lift away motor bracket (4), tension spring (5), and disconnect motor wiring harness (not shown).
5. Perform steps a through c if the motor requires replacement:
   a) Remove two screws (6) securing defective motor (7) to plate (8).
   b) Secure plate (8) to replacement motor (7) using two screws (6).
   c) Advance to step 11 to install and connect motor assembly (2).

> NOTE: A properly installed plate will be oriented so that its chamfered corner is in the lower corner on the opposite side of the motor as its wiring harness connector.

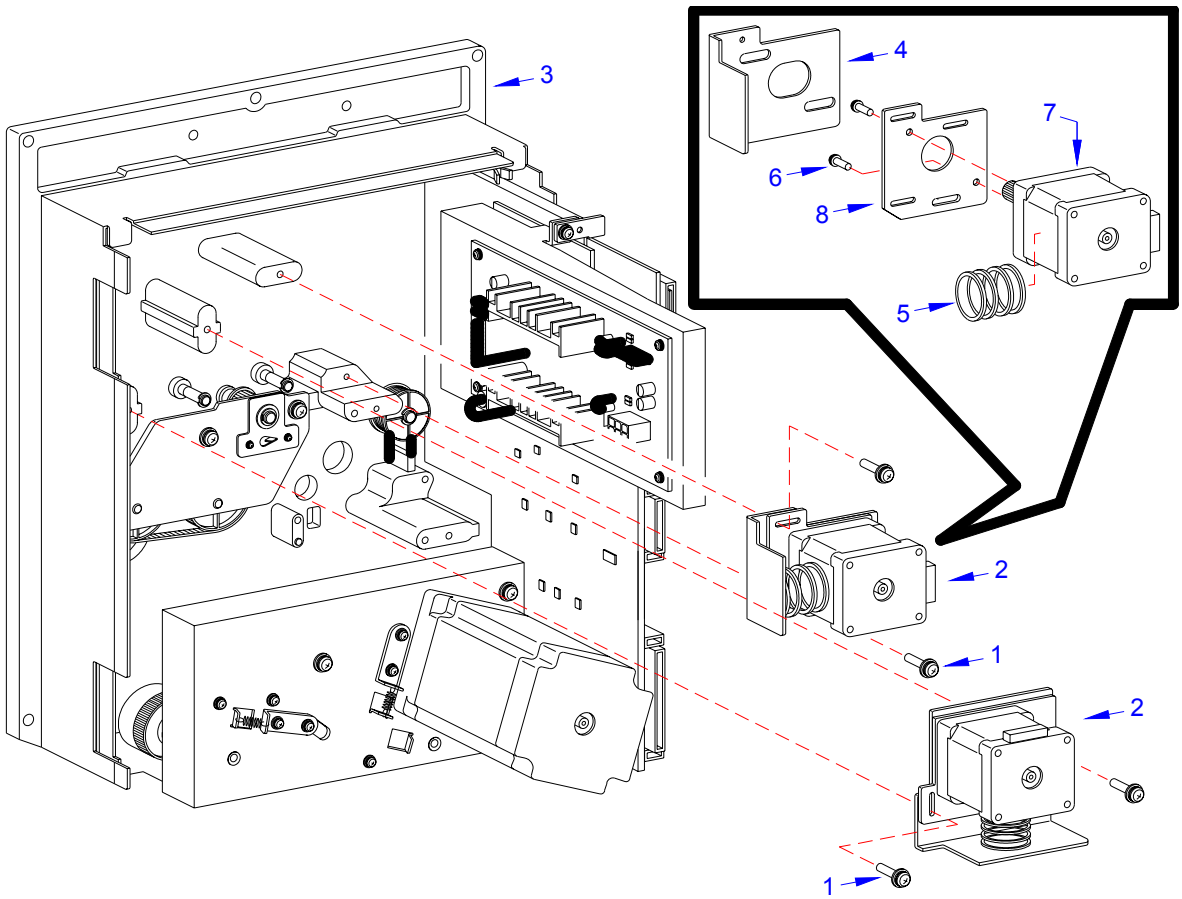


Figure 7-5a, Ribbon Spindle Motors/Belts/Pulleys Replacement

6. Repeat steps 3 and 4 for the second motor assembly (2) if belt and pulleys are to be replaced.
7. Perform step 5 if the second motor is to be replaced.

> NOTE: Both motors are identical and their assemblies are assembled identically. Their only difference is their orientation when mounted to the printer's frame.

8. Detach snap ring (9, Figure 7-5b) and remove two screws (10) securing pulley bracket (11). Lift away (11).

> NOTE: Remember the orientation of belts and pulleys prior to their removal.

9. Replace all belts (not referenced) and pulleys (not referenced) as deemed necessary in the orientation as was removed.
10. Secure pulley bracket (11) to printer frame (3) using two screws (10) and snap ring (9).

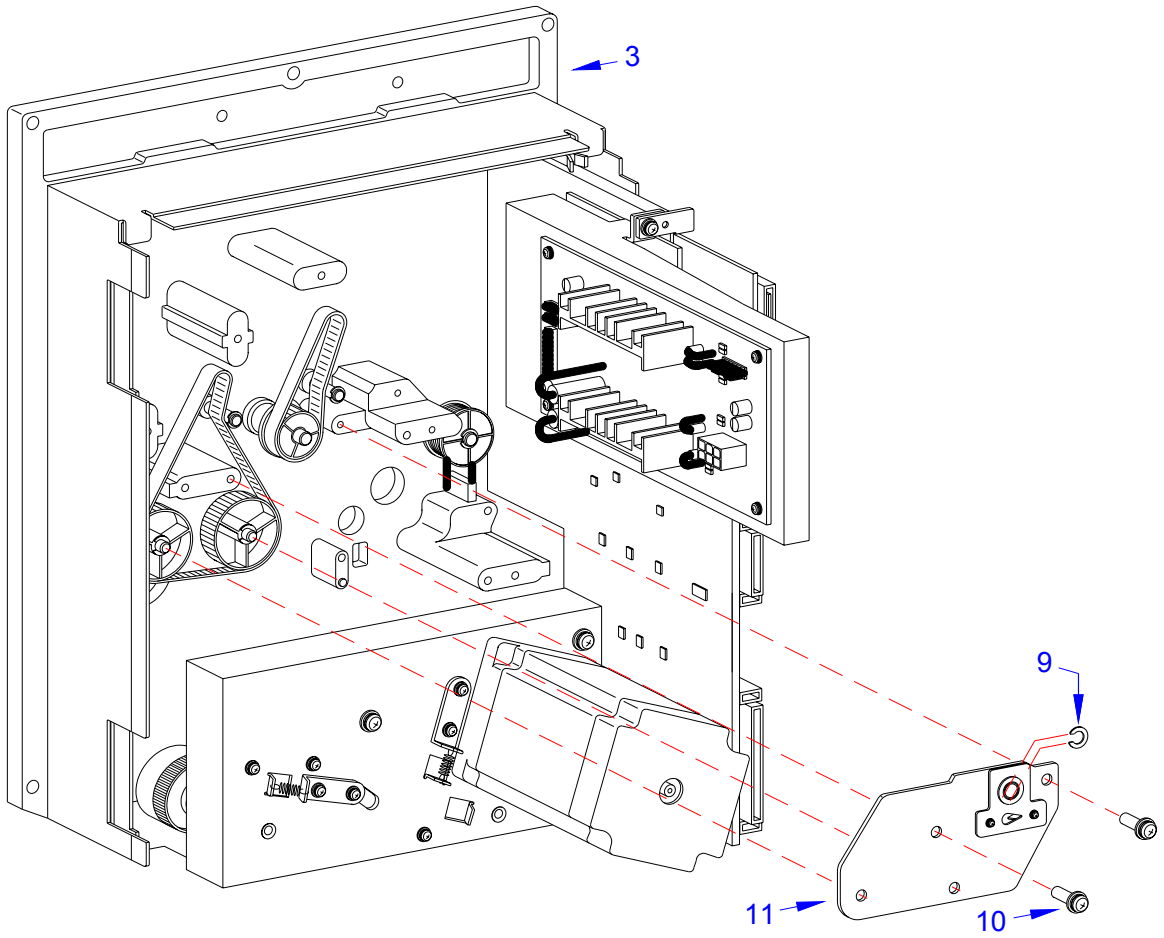


Figure 7-5b, Ribbon Spindle Motors/Belts/Pulleys Replacement

11. Apply tension spring (5, Figure 7-5a), motor bracket (4) to motor plate (8) and secure the assembly (2) to printer frame (3) using two screws (1).

> NOTE: Ensure the motor spindle inserts within the free end of its respective belt and that the belt is properly routed.

12. Repeat step 11 to install the second motor assembly and reconnect both motor wiring harnesses.
13. Close housing covers, install interface cards, restore power, and test print to ensure proper function.

RIBBON-SAVER DRIVE MOTOR & BELT REPLACEMENT

The ribbon-saver feature is an electronically controlled, mechanical function that incorporates the use of a motor transferring torque to a belt and pulley configuration mobilizing the saver-lever attached to the print assembly.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open the rear housing covers.

> NOTE: Figure 9-1 in the Appendix unit displays cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (1, Figure 7-6) securing motor assembly (2) to printer frame (3).
4. Lift away motor bracket (4), tension spring (5), and disconnect motor wiring harness (not shown).
5. Perform steps a and b if the motor requires replacement:
   a) Remove two screws (6) securing defective motor (7) to plate (8).
   b) Secure plate (8) to replacement motor (7) using two screws (6).

> NOTE: A properly installed plate will be oriented so that its notched corner is aligned with the motor's lower corner on the same side as its wiring harness connector.

6. Withdraw worn timing belt (9) from pulley (10) and insert replacement belt (9) in its place.
7. Apply tension spring (5), motor bracket (4) to motor plate (8) and secure the assembly (2) to printer frame (3) using two screws (1). Connect wiring harness (not shown).

> NOTE: Ensure the motor spindle inserts within the free end of its respective belt.

8. Close housing covers, install interface cards, restore power, and test print to ensure proper function.

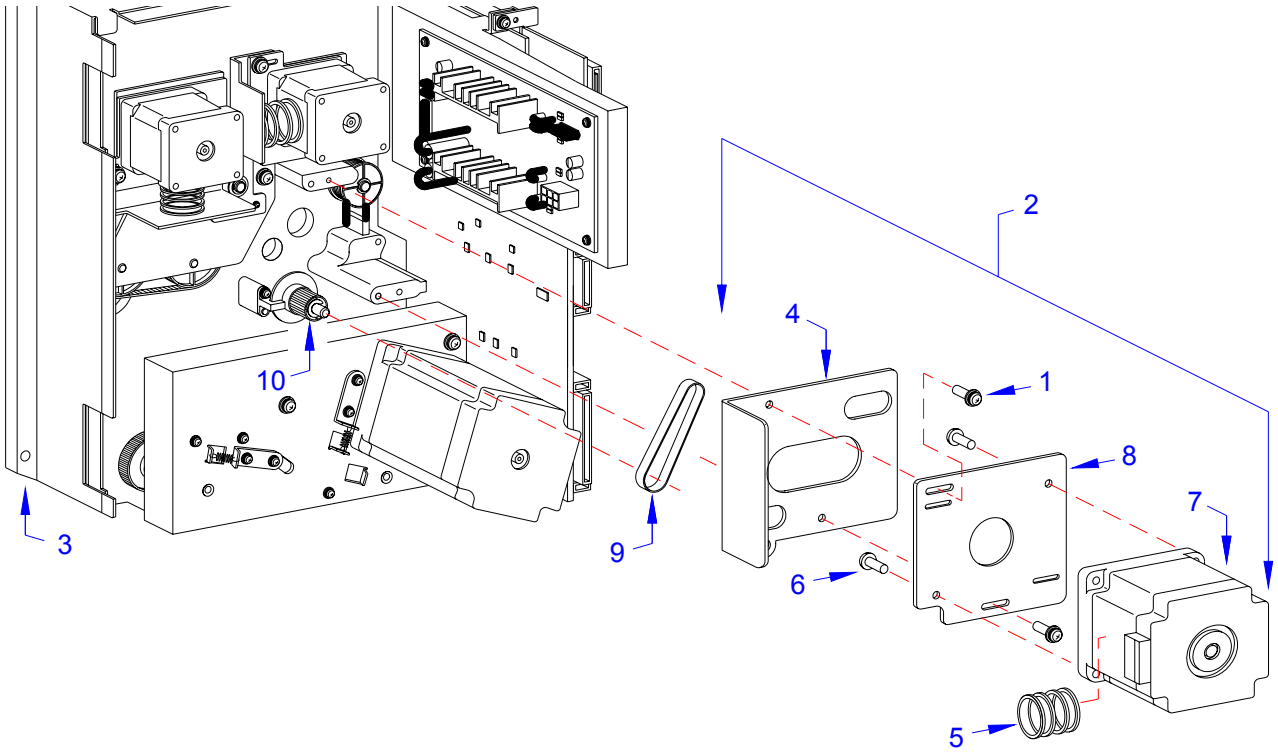


Figure 7-6, Ribbon-Saver Drive Motor & Belt Replacement

RIBBON CASSETTE TIMNG BELT & ROLLERS REPLACEMENT

The ribbon cassette feature allows the quick reloading of ribbon stock once an existing roll has been exhausted. This is achieved by maintaining a loaded cassette on standby at all times. Like the non-cassette printer model, the cassette is comprised of rollers and a single belt of the same type and in the same configuration. Also like the non-cassette model, to replace these components, the rear frame or plate that rests against the printer's center wall, must be removed to gain access.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Detach the two ribbon bosses (not shown) from the cassette.
3. Remove five screws (1, Figure 7-7), two screws (2), and one screw (3) from rear plate (4).
4. Separate rear plate (4) from front plate (5) and withdraw worn belt (6).
5. Detach snap ring (7) and withdraw bearing (8) from ribbon roller (9) to replace.
6. Detach snap ring (10) and withdraw set screw (not shown) from gear (11) to replace ribbon roller (12).
7. Insert replacement ribbon roller (12) into its respective orifice of rear plate (4), apply gear (11) and secure using set screw (not shown) and snap ring (10).
8. Insert replacement ribbon roller (9) into its respective orifice of rear plate (4) and secure using snap ring (7).
9. Apply replacement timing belt (6) to ribbon roller (9).
10. Apply rear plate (4) to front plate (5) and secure using one screw (3), two screws (2), five screws (1).

> NOTE: Ensure the timing belt is properly routed and all protruding components insert into their respective slots when assembling the front and rear plates. Refer to Figure 7-8 for proper timing belt routing.

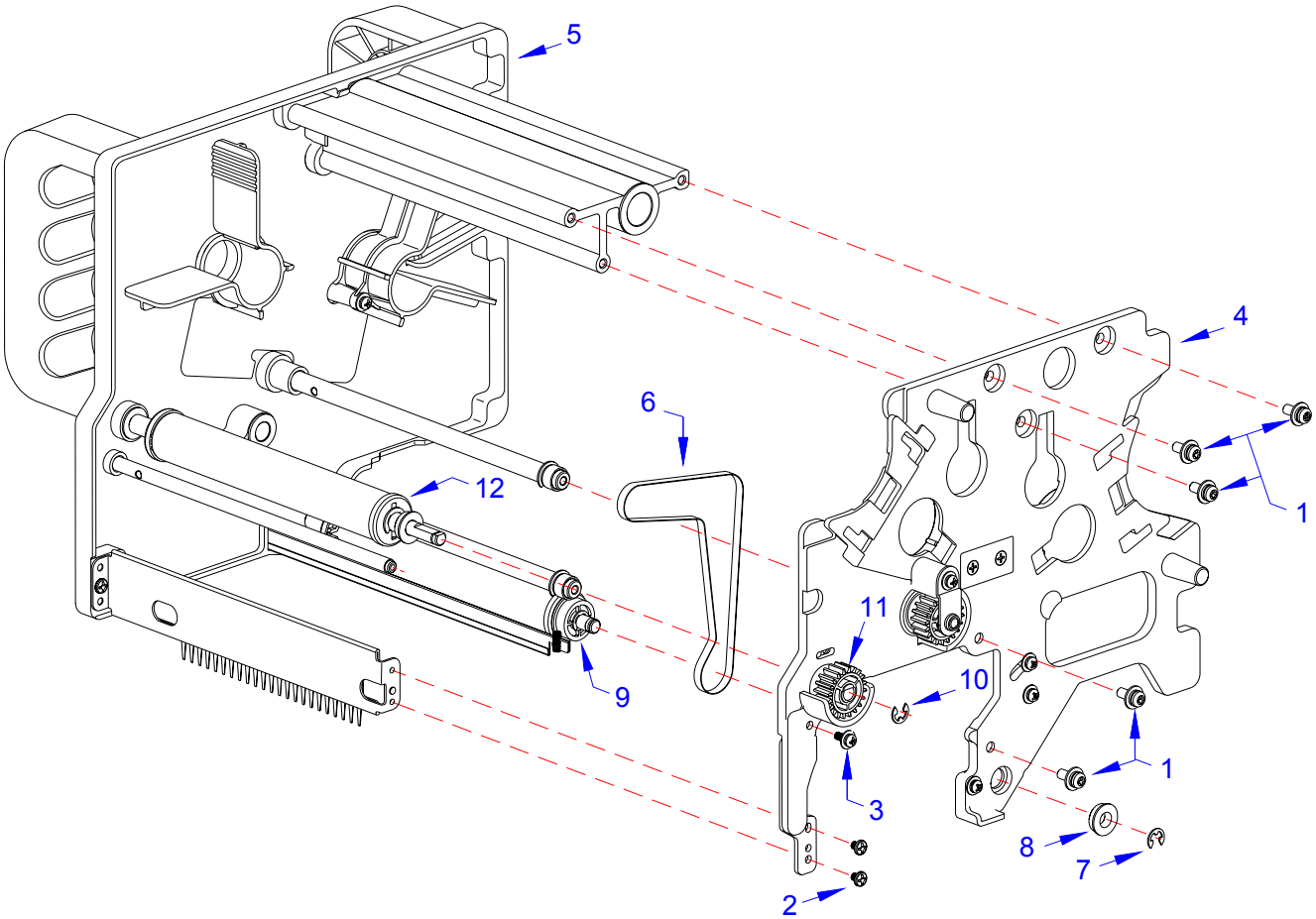


Figure 7-7, Ribbon Cassette Belt & Roller Replacement

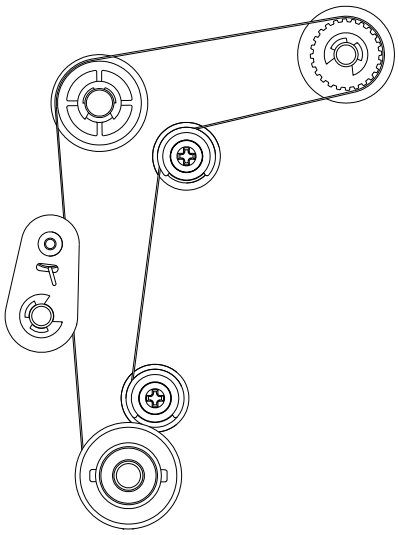


Figure 7-8, Ribbon Cassette Belt Route Diagram

RIBBON BOSS/TORQUE LIMITER (DIRECT LOAD)

Each printer model incorporates the use of a ribbon supply spindle and a ribbon rewind spindle. Whereas the ribbon spindle assemblies differ for different models, both the supply and rewind spindles are identical in components and assembly as it relates to those addressed here.

This chapter covers the replacement of ribbon spindle components located on the printer's print side for those models that provide for direct loading of ribbon stock.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the front housing cover to gain access to the print assembly.
3. Remove ribbon stock if presant to access ribbon spindle assembly (1, Figure 7-9).
4. Insert a small diameter shaft or tool into slot (A) and through to the opposite side.

> NOTE: Insert a screwdriver into screw (2) to rotate the spindle to align it with slot (A) so that the shaft or tool may pass through it.

5. Use the shaft or tool to loosen screw (2), then remove the tool.
6. Remove screw (2), front boss (3), torque limiter (4), pin (5), rear boss (6), and torque limiter (7) from ribbon spindle (8). Leave pin (9) in place.

> NOTE: The two torque limiters have minor differences. Keep them separate.

7. Using replacement parts as required; insert torque limiter (7), rear boss (6), pin (5), torque limiter (4), front boss (3) onto ribbon spindle (8) and secure using screw (2).

> NOTE: A properly installed torque limiter will be oriented so that its metal end is inserted onto the spindle first and will engage each respective pin. Properly installed ribbon bosses will engage their respective torque limiters. Rotate each while appliying forward pressure to ensure proper nesting.

8. Insert the shaft or tool into slot (A) of spindle assembly (1) and hold firmly to tighten screw (2).
9. Repeat steps 4 through 8 for the second ribbon spindle (1) as necessary.

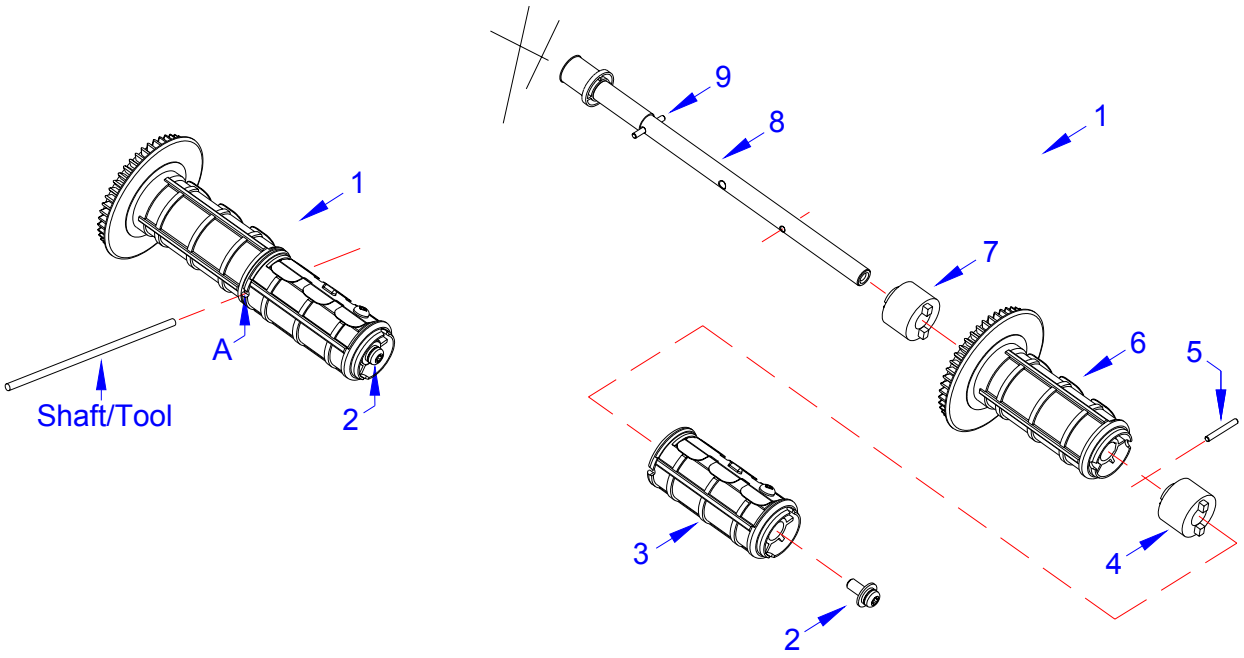


Figure 7-9, Ribbon Boss & Torque Limiter Replacement (Direct Load)

RIBBON BOSS/TORQUE LIMITER (CASSETTE LOAD)

Each printer model incorporates the use of a ribbon supply spindle and a ribbon rewind spindle. Whereas the ribbon spindle assemblies differ for different models, both the supply and rewind spindles are identical in components and assembly as it relates to those addressed here.

This chapter covers the replacement of ribbon spindle components located on the printer's print side for those models that provide for casstte loading of ribbon stock.

1. Detach ribbon spindle assembly (1, Figure 7-10) from the ribbon cassette (not shown).
2. Insert a small diameter shaft or tool into slot (A) and through to the opposite side.

> NOTE: Insert a screwdriver into screw (2) to rotate the spindle to align it with slot (A) so that the shaft or tool may pass through it.

3. Use the shaft or tool to loosen screw (2), then remove the tool.
4. Remove screw (2), boss extension (3), front boss (4), torque limiter (5), pin (6), rear boss (7), and torque limiter (8) from ribbon spindle (9). Leave pin (10) in place.

> NOTE: The two torque limiters have minor differences. Keep them separate.

5. Using replacement parts as required; insert torque limiter (8), rear boss (7), pin (6), torque limiter (5), front boss (4), boss extension (3) onto ribbon spindle (9) and secure using screw (2).

> NOTE: A properly installed torque limiter will be oriented so that its metal end is inserted onto the spindle first and will engage each respective pin. Properly installed ribbon bosses will engage their respective torque limiters. Rotate each while appliying forward pressure to ensure proper nesting.

6. Insert the shaft or tool into slot (A) of spindle assembly (1) and hold firmly to tighten screw (2).
7. Repeat steps 2 through 6 for the second ribbon spindle (1) as necessary.

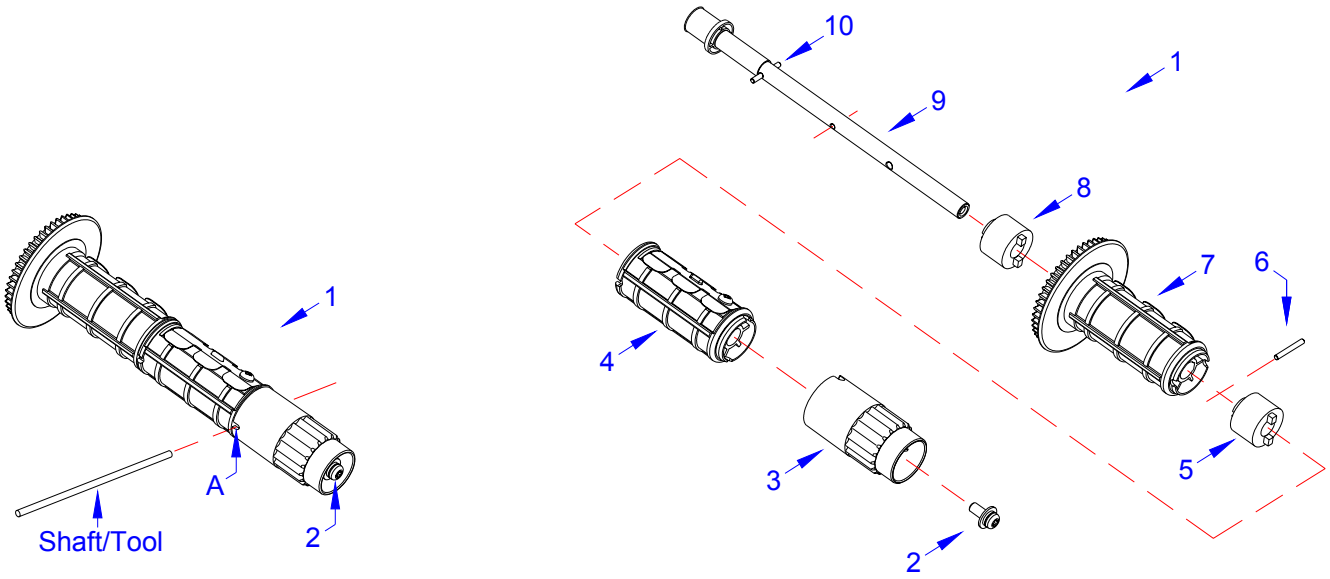


Figure 7-10, Ribbon Boss & Torque Limiter Replacement (Cassette Load)

MAIN BOARD REPLACEMENT

The main circuit board is the primary brain-center for all printer activities. Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open the rear housing covers to access main circuit board (1, Figure 7-11).

> NOTE: Figure 9-1 of the Appendix unit for displays housing cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (2) securing defective main board (1) to the printer. Withdraw defective main board (1).
4. Disconnect all wiring harnesses from defective main board (1) and detach flash card (not shown) if present.
5. Remove four screws (3) from defective main board (1) to upper bracket (4) and lower bracket (5).
6. Remove one screw (6) from board (7) to free defective main board (1).
7. Secure board (7) and brackets (5, 4) to replacement main board (1) using screws (6) and (3) respectively.
8. Insert flash card (not shown) as required and connect all wiring harnesses to replacement main board (1).

> NOTE: Each of the printer's wiring harness connectors are different from all others to ensure proper mating. Mate each matching half for connection.

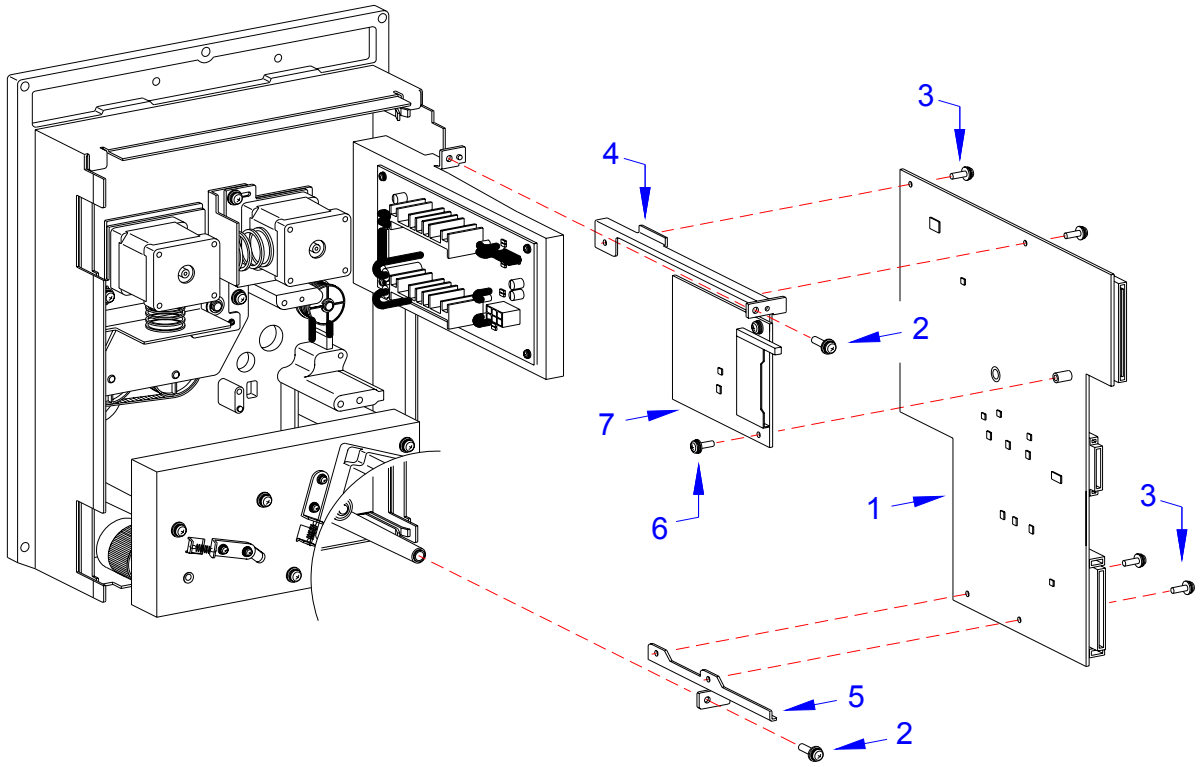


Figure 7-11, Main Circuit Board Replacement

9. Insert replacement main board (1) into the printer and secure using two screws (2).

> **CAUTION:** ENSURE THAT WIRING HARNESSES ARE NOT PINCHED DURING INSTALLATION AND THAT ALL REMAIN AWAY FROM MOVINGS COMPONENTS WITHIN THE PRINTER.

10. Close rear housing covers, restore power, factory reset, and test print to ensure proper function.

SECONDARY BOARD REPLACEMENT

The secondary circuit board primarily controls motor movement and may require replacement if a motor is no longer properly functioning. Test the motor first, followed by its wiring harnesses, then replace secondary board as necessary.

Circuit boards generally have long lives due to the lack of moving parts. Typically, if a circuit board becomes defective, it is contributable to a negative external condition. If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open rear housing covers to access secondary circuit board (1, Figure 7-12).

> NOTE: Figure 9-1 of the Appendix unit for displays housing cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3.

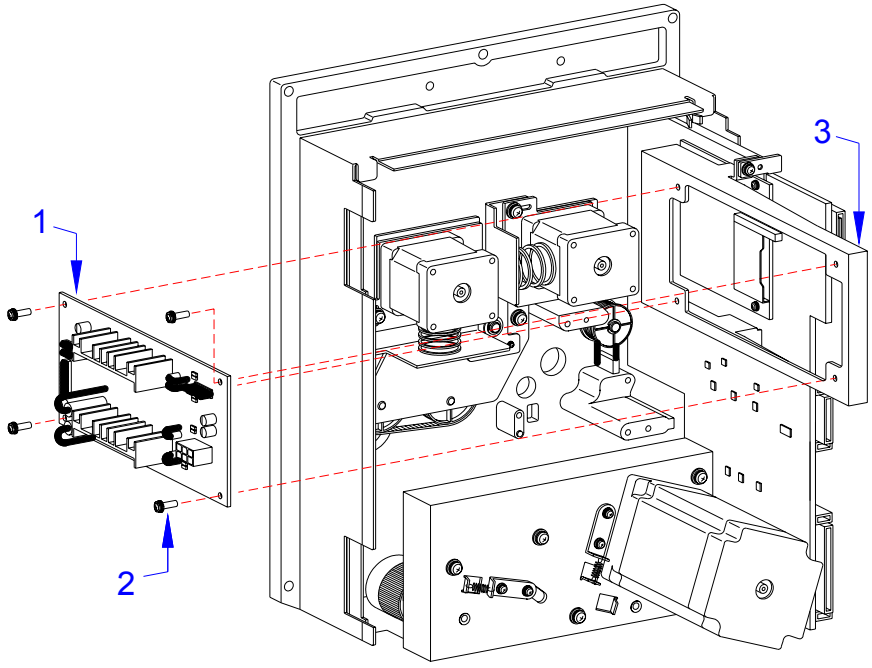


Figure 7-12, Secondary Board replacement

FLASH MEMORY BOARD REPLACEMENT

Circuit boards generally have long lives due to the lack of moving parts. Typically, if a circuit board becomes defective, it is contributable to a negative external condition. If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open rear housing covers to access printer's electrical side.

> NOTE: Figure 9-1 of the Appendix unit for displays housing cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (1, Figure 7-13) securing main circuit board (2) to the printer.
4. Withdraw main circuit board (2) along with defective flash-memory board (3) from printer.
5. Remove two screws (4) securing defective flash-memory board (3) to main circuit board (2).
6. Detach defective flash-memory board (3) and attach replacement flash-memory board (3). Secure using two screws (4).
7. Insert main circuit board (2) into printer and secure using two screws (1).
8. Insert flash card (not shown), close rear housing covers, restore power, and test print to ensure proper function.

> **CAUTION:** ENSURE THAT WIRING HARNESSES ARE NOT PINCHED DURING INSTALLATION AND THAT ALL REMAIN AWAY FROM MOVINGS COMPONENTS WITHIN THE PRINTER.

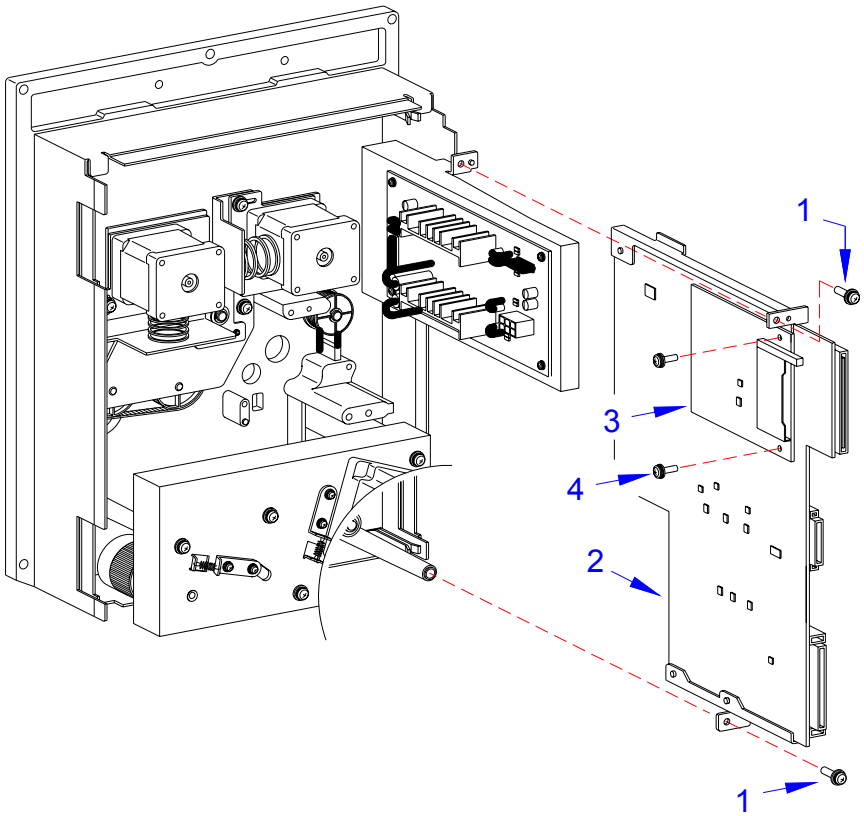


Figure 7-13, Flash-Memory Board Replacement

POWER BOARD REPLACEMENT

The power board contains the printers transformers, relays, etc., for transferance of electrical current from the source supply to the printer's control circuits.

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the power board has become defective, search the printer over for possible visual factors that may have led to the damage.

1. Switch off the printer, observe applicable lockout-tagout procedures, and disconnect power cord.
2. Remove all interface cards and open rear housing covers to access power board (1, Figure 7-14).

> NOTE: Figure 9-1 of the Appendix unit displays cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Disconnect all wiring harnesses from defective power board (1).
4. Remove four screws (2) securing defective power board (1) to rear housing cover (3).
5. Withdraw defective power board (1) and insert replacement power board (1) to housing cover (3).
6. Reconnect all relative wiring harnesses previously disconnected.

> NOTE: Each of the printer's wiring harness connectors are different from all others to ensure proper mating. Mate each matching half for connection.

7. Close rear housing cover, restore power, and test print to ensure proper function.

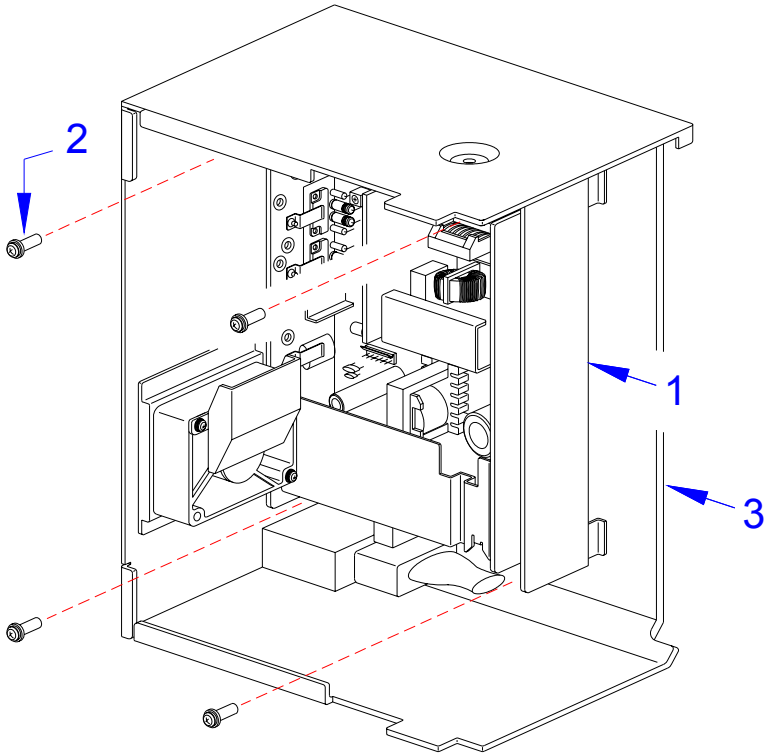


Figure 7-14, Power Board Replacement

PANEL/LCD BOARD REPLACEMENT

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Locate panel board assembly (1, Figure 7-15a) located on the upper front of printer frame (2).
3. Remove two knurled thumbscrews (3) securing panel board assembly (1) to printer frame (2).
4. Lift away panel board assembly (1) and disconnect wiring harness (not referenced).

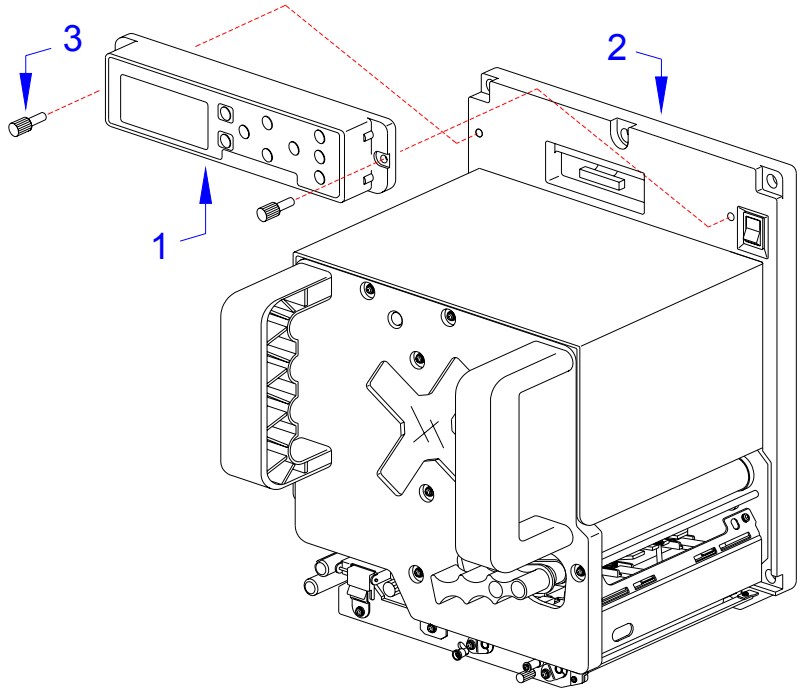


Figure 7-15a, Panel/LCD Board Replacement

5. Remove four screws (4, Figure 7-15b) securing mounting plate (5) to panel cover (6). Lift away plate (5).

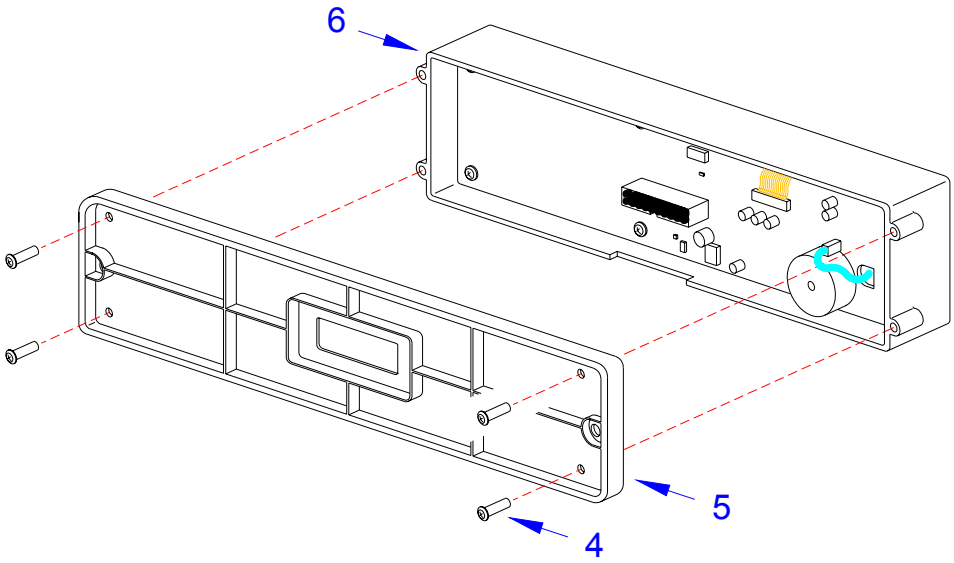


Figure 7-15b, Panel/LCD Board Replacement

6. Remove four screws (7, Figure 7-15c) securing panel board (8) to panel cover (6). Lift away board (8).
7. Detach LCD board (9) from panel board (8) and replace as necessary.
8. Attach LCD board (9) to panel board (8).
9. Ensure panel board buttons (10) are properly placed within panel cover (6).

> NOTE: To properly install the panel board, insert its right end under the tab on the right end of the panel cover followed by the left end.

10. Apply replacement panel board (8) to panel cover (6) and secure using four screws (7).

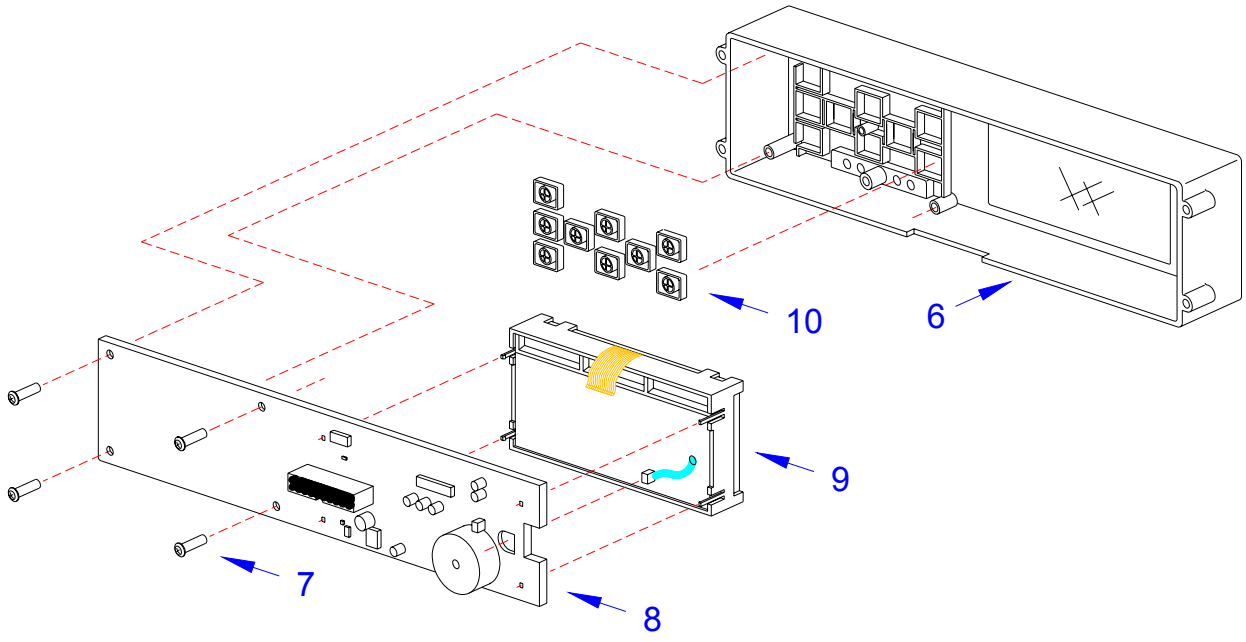


Figure 7-15c, Panel/LCD Board Replacement

11. Apply mounting plate (5, Figure 7-15b) to panel cover (6) and secure using four screws (4).
12. Reconnect wiring harness (not referenced) and secure board assembly (1, Figure 7-15a) to frame (2) using two knurled thumbscrews (2).
13. Restore power and test print labels to ensure proper function.

INTERFACE BOARD REPLACEMENT

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

1. Switch off the printer and observe appilcable lockout-tagout procedures.
2. Disconnect interface cable (1, Figure 7-16) from defective interface board (2).
3. Remove two screws (3) securing defective interface board (2) to printer (4).
4. Insert replacement interface board (2) into printer (4) and secure using two screws (3).
5. Connect interface cable (1).

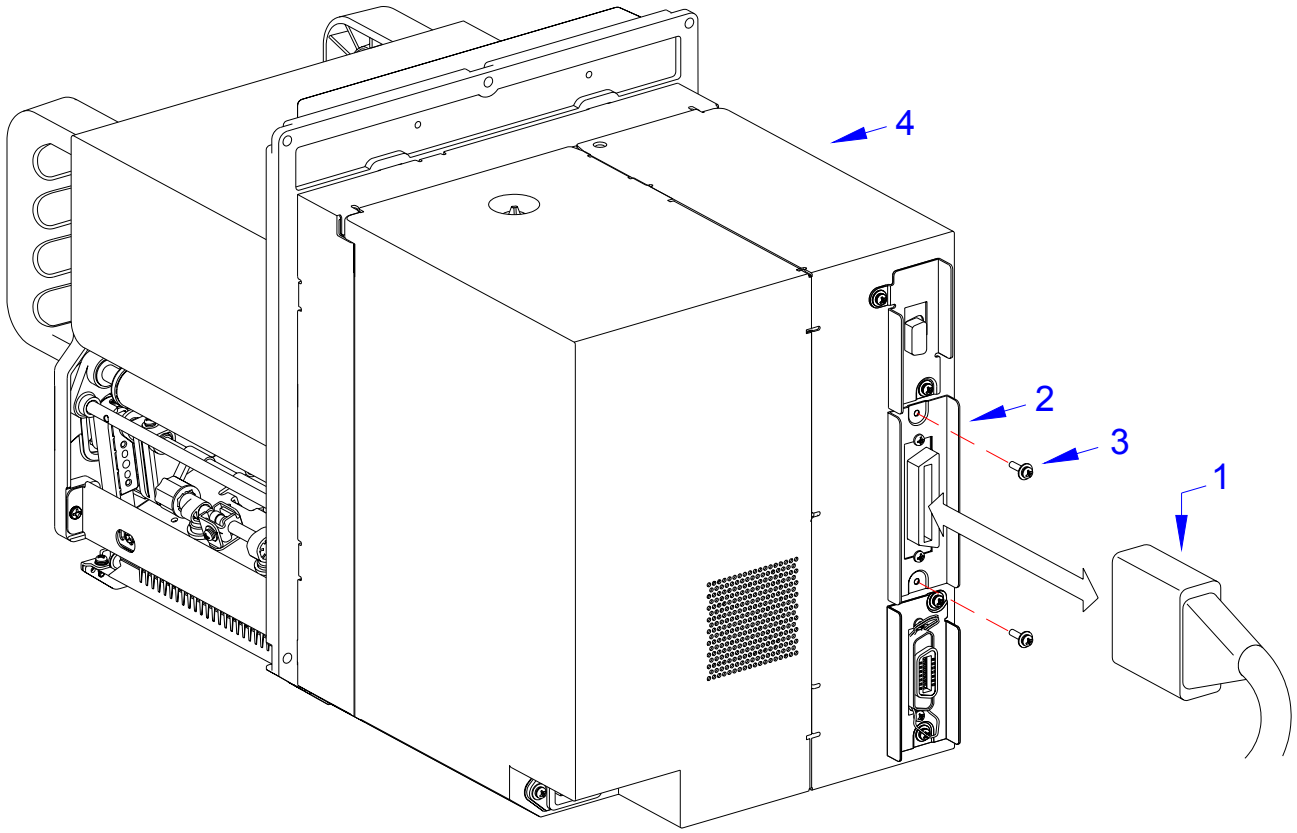


Figure 7-16, Interface Board Replacement

LABEL SENSOR REPLACEMENT

The label sensor is a sensor complex comprised of the label-out sensor, gap reciever, and eye-mark sensor all contained within a single housing. This sensor assembly is mounted to the printer's center frame to protrude across the printer's chassis.

The label sensor assembly may be easily identified by its purple adjustment knob located behind the print assembly.

> **ATTENTION:** Before replacing the assembly assuming the sensor defective, ensure that the condition is not the result of debris buildup. Thoroughly clean the sensor before replacing it.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the printer's front cover or remove it's ribbon cassette as applicable.
3. Remove media from the printer to access the printer's chassis (1, Figure 7-17a).
4. Remove two screws (2) securing upper label assembly (3) to center frame (4). Withdraw assembly (3).

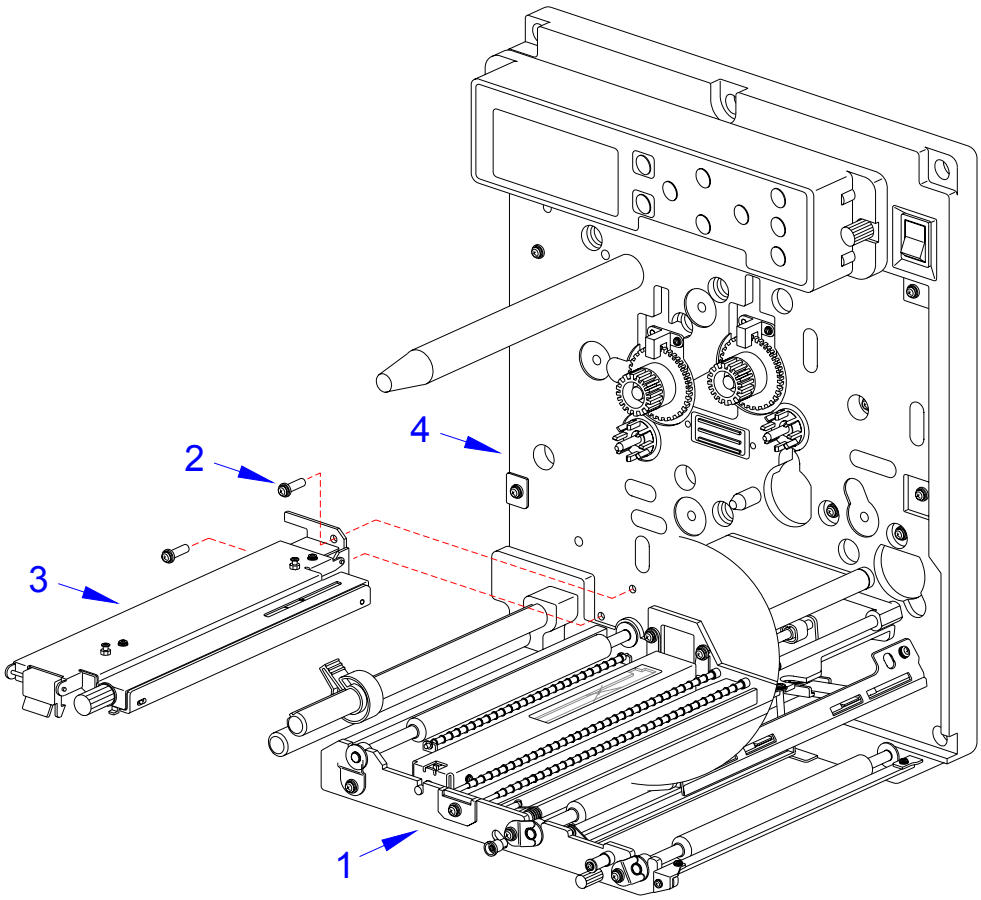


Figure 7-17a, Label Sensor Replacement

5. Remove two screws (5, Figure 7-17b) securing lower cover (6) to upper cover (7).
6. Detach defective upper sensor (8) from upper cover (7) and disconnect wiring harness (not shown).
7. Connect wiring harness (not shown) to replacement upper sensor (8) attach to upper cover (7).
8. Secure upper cover (7) to lower cover (6) using two screws (5).

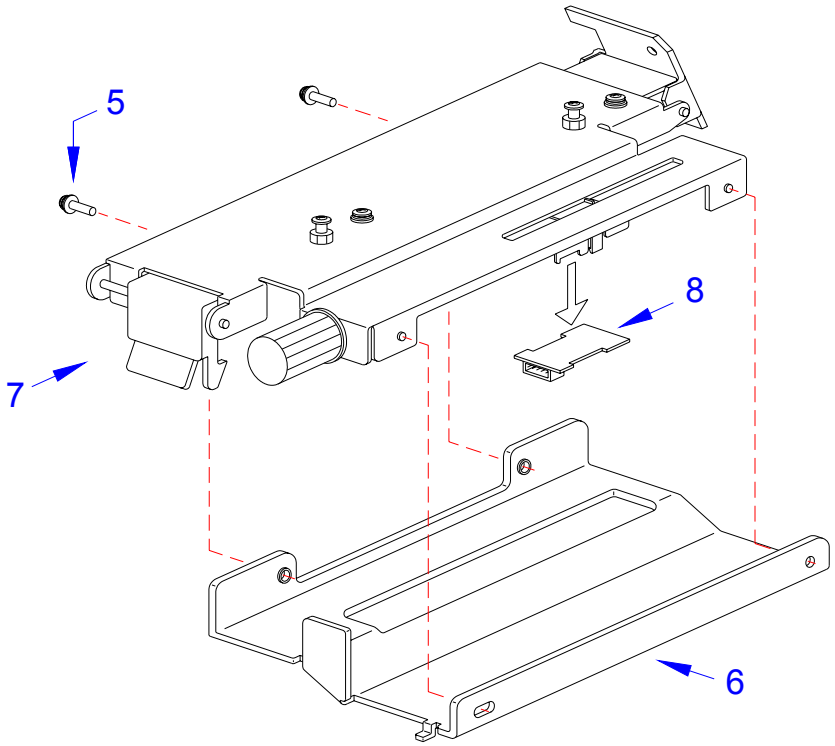


Figure 7-17b, Label Sensor Replacement

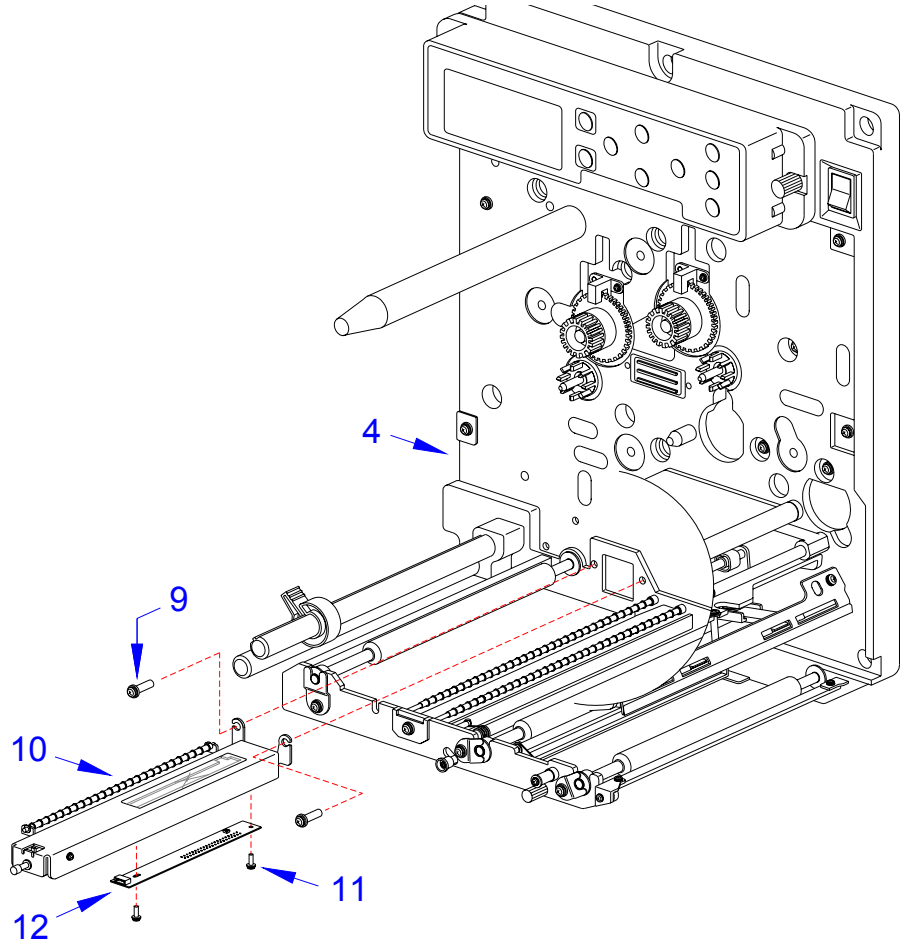


Figure 7-17c, Label Sensor Replacement

9. Remove two screws (9, Figure 7-17c) securing lower label assembly (10) to center frame (4). Withdraw (10).
10. Remove two screws (11) securing defective lower sensor (12) to lower label assembly (10) and disconnect wiring harness (not shown).
11. Connect wiring harness (not shown) to replacement lower sensor (12).
12. Secure replacement lower sensor (12) to lower label assembly (10) using two screws (11).
13. Secure lower label assembly (10) to center frame (4) using two screws (9).
14. Secure upper label assembly (3, Figure 7-17a) to center frame (4) using two screws (2).
15. Load printer, restore power, and test print to ensure proper function.

HEAD-OPEN SENSOR REPLACEMENT

The head-open sensor disables the printer if the print head is not properly latched. The sensor is of a transmit/ receive variety. When the print head is latched, a metal plate is rotated between the two sensor halves prompting a signal to be transmitted to the processor. The processor in turn, relays a signal to the panel board.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the printer's rear housing covers to access the printer's electrical side.

> NOTE: Figure 9-1 of the Appendix unit displays cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (1, Figure 7-18a) and one screw (2) securing platen motor assembly (3) to frame (4).
4. Withdraw platen motor assembly (3) from the printer and unlatch print head (not shown).

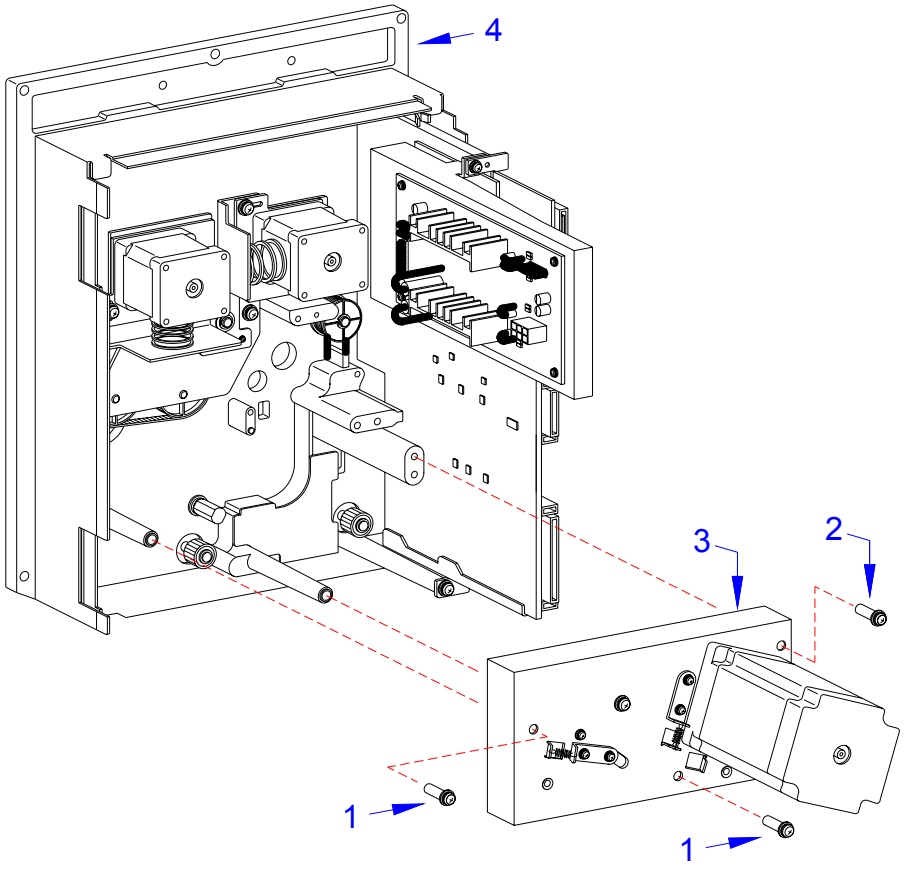


Figure 7-18a, Head-Open Sensor Replacement

5. Remove one screw (5, Figure 7-18b) securing defective head-open sensor (6) to frame (4).
6. Disconnect wiring harness (not referenced) from defective sensor (6) and connect to replacement sensor (6).
7. Secure replacement head-open sensor (6) to frame (4) using screw (5).

> NOTE: A properly installed sensor will be oriented so that it's directed upward.

8. Latch and unlatch the print head to ensure unempeded movement.

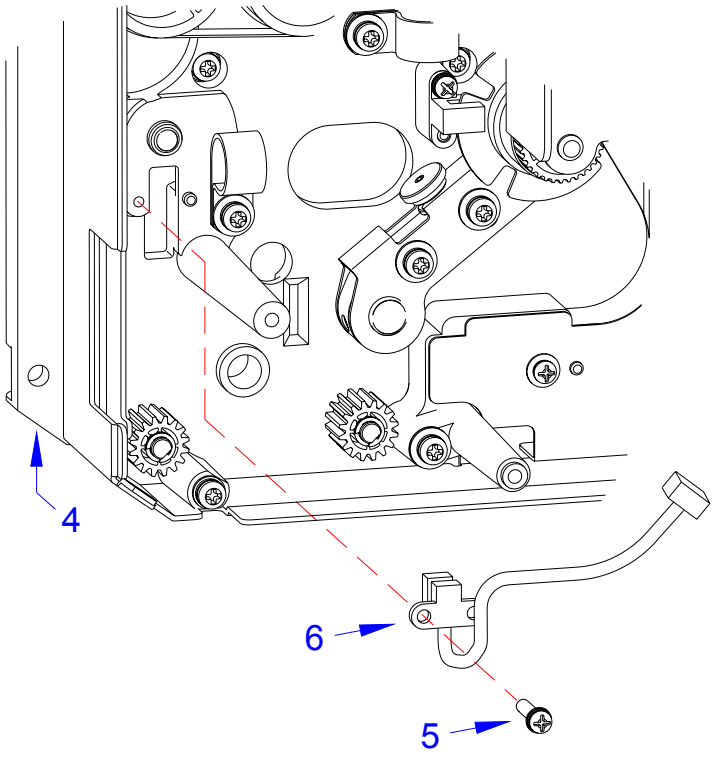


Figure 7-18b, Head-Open Sensor Replacement

9. Secure platen motor assembly (3, Figure 7-18a) to frame (4) using one screw (2) and two screws (1).

> NOTE: Secure the three short ground cables to the platen motor bracket using the leftmost screw (1) and the two longer ground cables using the rightmost screw (1).

10. Close rear housing covers, restore power, and latch/unlatch print head to ensure proper function.

RIBBON SENSOR REPLACEMENT

The ribbon sensor monitors the revolutions of the ribbon supply spindle and sends a signal to the processor to control rewind timing. This sensor has an integrated transmitter and receiver with each positioned on opposite sides of the supply spindle's toothed disk plate. The toothed portion of the disk plate intermittantly interrupts and blocks the sensors transmission/reception.

ATTENTION: Before assuming the sensor is defective and replacing the assembly, ensure that the condition is not the result of debris buildup. Thoroughly clean the sensor before replacing it.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the printer's front cover and remove ribbon stock or remove ribbon cassette as applicable.
3. Remove two knurled thumbscrews (1, Figure 7-19) securing panel board assembly (2) to printer frame (3).
4. Disconnect wiring harness (not shown) from panel board assembly (2) and set aside.
5. Remove one screw (4) securing defective sensor (5) to frame (3) and disconnect its wiring harness (A).
6. Feed wiring harness (A) of replacement sensor (5) through slot in frame (3) and connect to harness (A).
7. Secure replacement ribbon sensor (5) to printer frame (3) using screw (4).

NOTE: A properly installed sensor will be oriented so it's facing downward.

8. Repeat steps 4 through 7 for the second sensor (5) as necessary.
9. Reconnect wiring harness (not shown) to panel board assembly (2) and secure to frame (3) using screws (1)
10. Reload printer, restore power, and test print to ensure proper function.

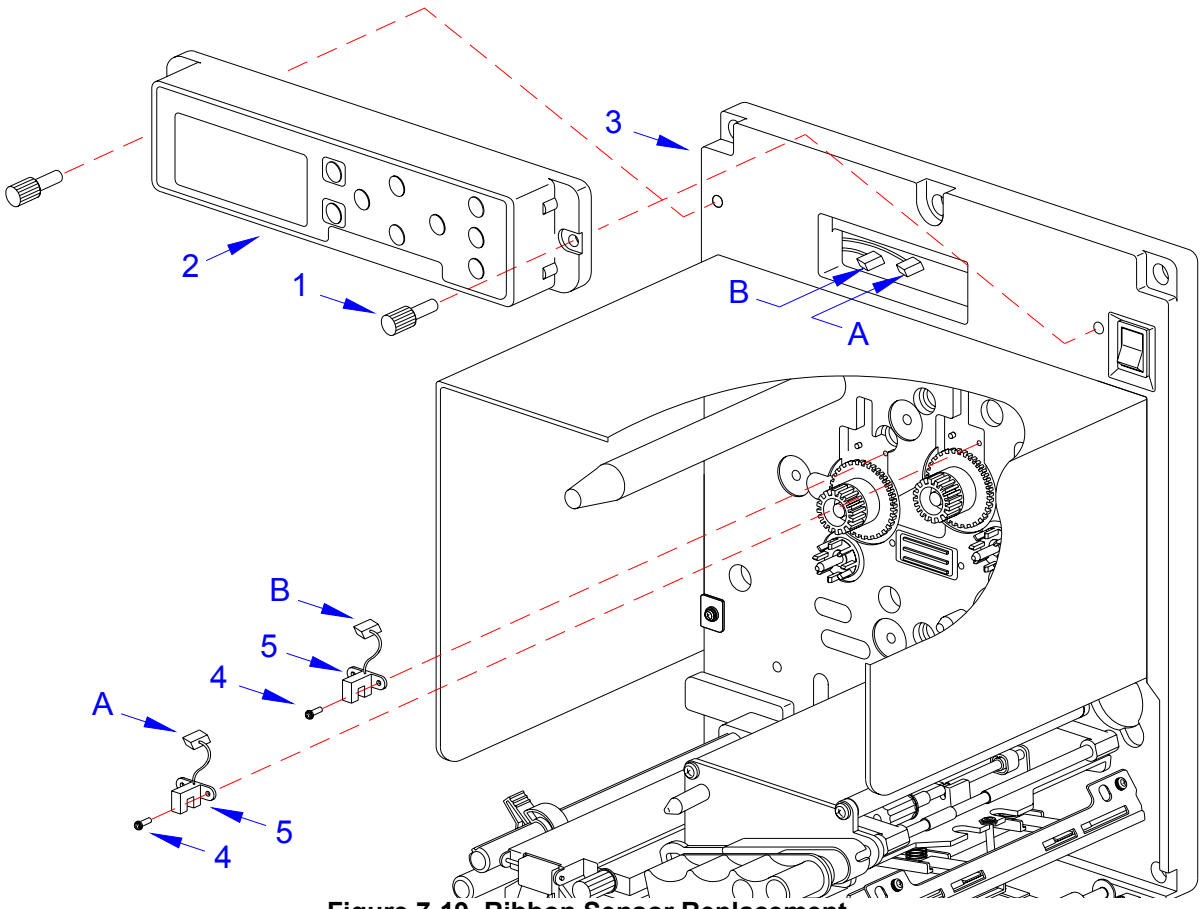


Figure 7-19, Ribbon Sensor Replacement

RIBBON-END SENSOR REPLACEMENT (DIRECT LOAD)

The ribbon-end sensor informs the operator when ribbon stock has been exhausted and reloading is required.

> **ATTENTION:** Before assuming the sensor is defective and replacing the assembly, ensure that the condition is not the result of debris buildup. Thoroughly clean the sensor before replacing it.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove ribbon stock and leave print head unlatched.
3. Remove screw (1, Figure 7-20a), front boss (2), torque limiter (3), pin (4), rear boss (5), and torquelimiter (6) from ribbon rewind spindle (7).

> NOTE: To dismantle the ribbon spindle assembly, insert a small diameter shaft betwwen the front and rear ribbon bosses and through an orifice in the spindle. Rotate the bosses as necessary for alignment.

4. Remove two screws (8) securing belt cover (9). Withdraw belt cover (9).
5. Remove two screws (10) securing print head latch handle (11). Withdraw latch handle (11).
6. Remove three screws (12) and two screws (13) from front plate (14). Leave front plate (14) in place.

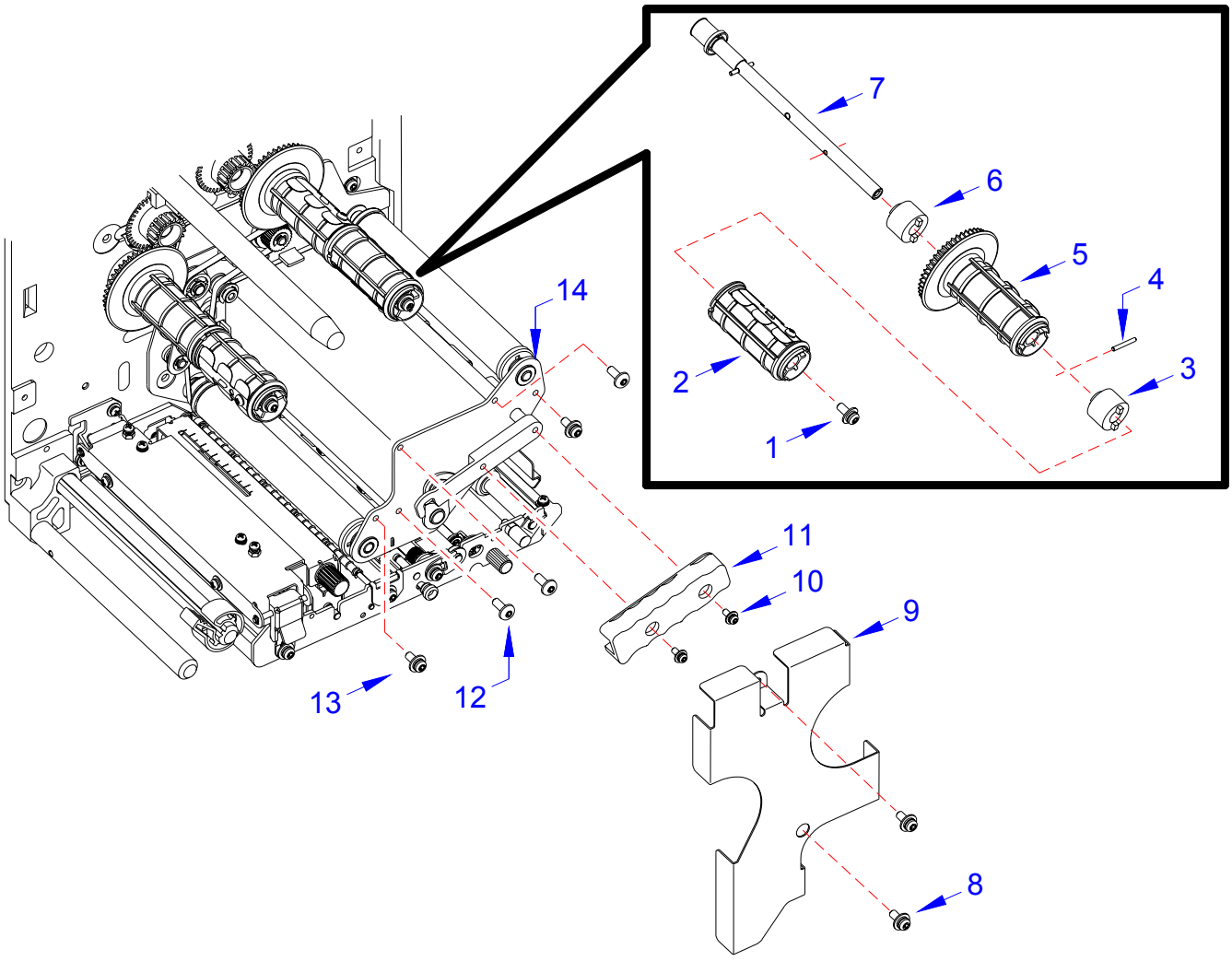


Figure 7-20a, Ribbon-End Sensor Replacement (Direct Load)

7. Remove one screw (15, Figure 7-20b) and two screws (16) from rear plate (17).
8. Withdraw ribbon roller assembly (18) from printer.

> NOTE: Manually hold the print head in the closed position to manipulate the roller assembly from the printer.

9. Remove one screw (19) securing defective ribbon-end sensor (20) to printer.
10. Disconnect defective sensor (20) from wiring harness (not shown).
11. Connect replacement sensor (20) to wiring harness (not shown) and secure to printer using screw (19).
12. Hold ribbon roller assembly (18) together while inserting into the printer, and secure using two screws (16), one screw (15).

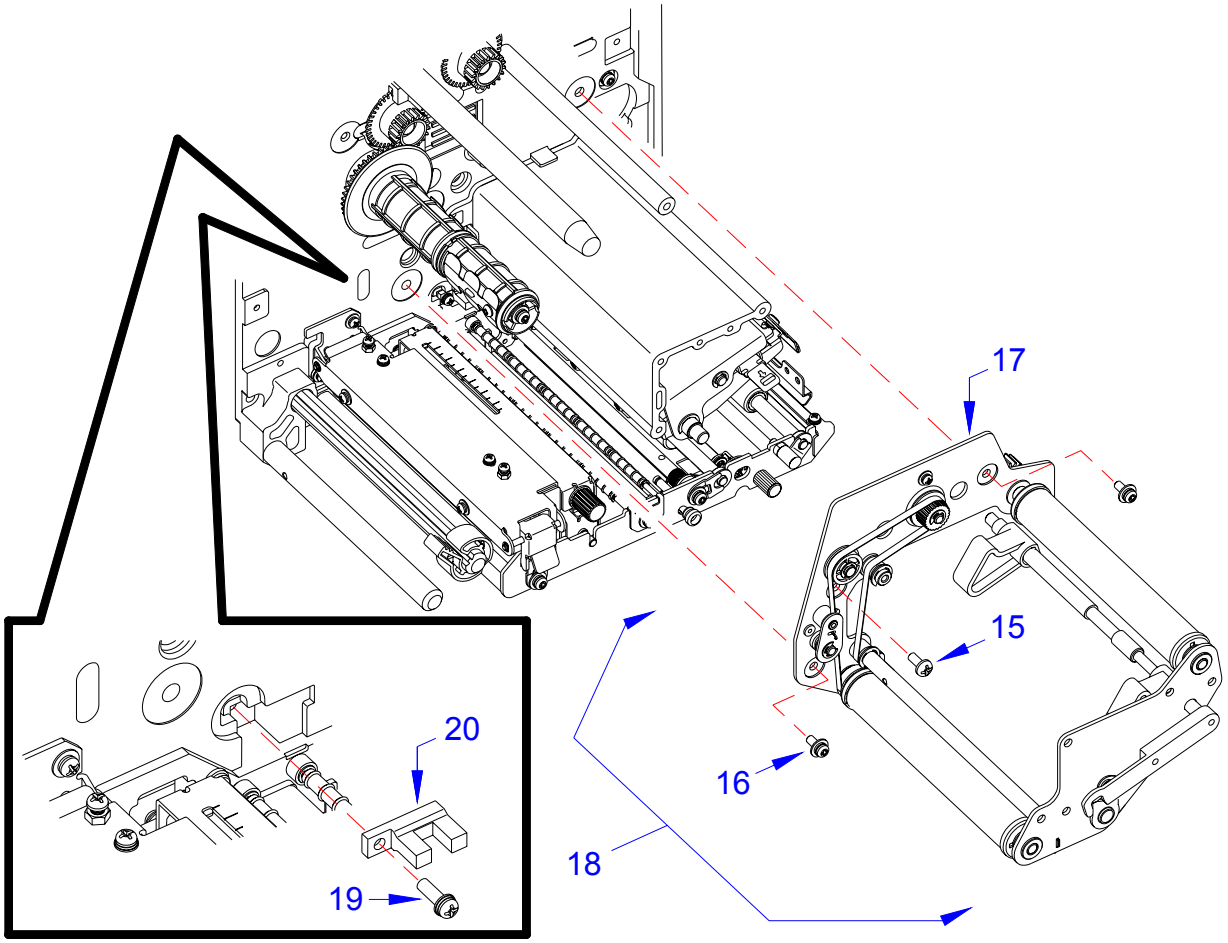


Figure 7-20b, Ribbon-End Sensor Replacement (Direct Load)

13. Secure front plate (14, Figure 7-20a) to the print assembly using two screws (13) and three screws (12).
14. Secure print head latch handle (11) to the latch using two screws (10).
15. Secure belt cover (9) to the printer using two screws (8).
16. Insert torque limiter (6), rear boss (5), pin (4), torque limiter (3), front boss (2) onto spindle (7) and secure using screw (1).

> NOTE: Ensure all loose components are properly positioned before assembly.

17. Reload printer, restore power, and test print to ensure proper function.

RIBBON-END SENSOR REPLACEMENT (CASSETTE LOAD)

The ribbon-end sensor informs the operator when ribbon stock has been exhausted and reloading is required.

> **ATTENTION:** Before assuming the sensor is defective and replacing the assembly, ensure that the condition is not the result of debris buildup. Thoroughly clean the sensor before replacing it.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove ribbon cassette and label media.
3. Remove screw (1, Figure 7-21) securing defective ribbon-end sensor (2) to printer frame.
4. Disconnect wiring harness (not referenced) from defective sensor (2) and connect to replacement sensor (2)
5. Secure replacement ribbon-end sensor (2) to printer frame.
6. Reload printer, restore power, and test print to ensure proper function.

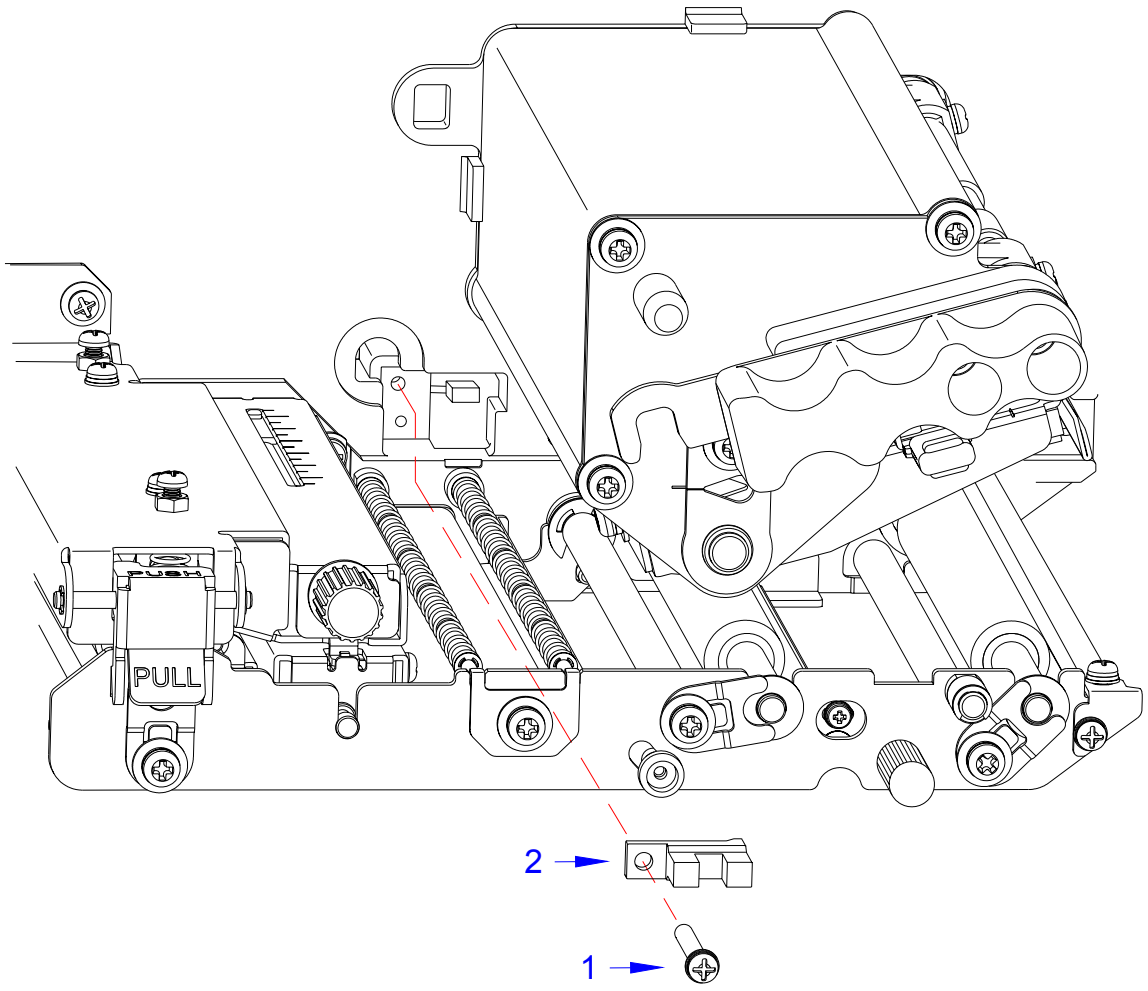


Figure 7-21, Ribbon-End Sensor Replacement (Cassette Load)

RIBBON-SAVER SENSOR REPLACEMENT

The ribbon-saver sensor is attached adjacent to, and is engaged with, a toothed disc plate. The disc plate rotates in response to the ribbon-saver motor. The toothed portion of the disc plate intermittantly interrupts and blocks sensor transmission/reception.

> **ATTENTION:** Before assuming the sensor is defective and replacing the assembly, ensure that the condition is not the result of debris buildup. Thoroughly clean the sensor before replacing it.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Remove all interface cards and open rear housing covers to access the printer's electrical side.

> NOTE: Figure 9-1 of the Appendix unit displays cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove screw (1) securing defective ribbon-saver sensor (2) to printer frame (3).
4. Disconnect wiring harness (not referenced) from defective sensor (2) and connect to replacement sensor (2)
5. Secure replacement ribbon-saver sensor (2) to printer frame (3) using screw (1).

> NOTE: A properly installed ribbon-saver sensor will be oriented so that it engages the toothed disc plate to its right.

6. Close rear housing covers, install interface cards, restore power, and test print to ensure proper function.

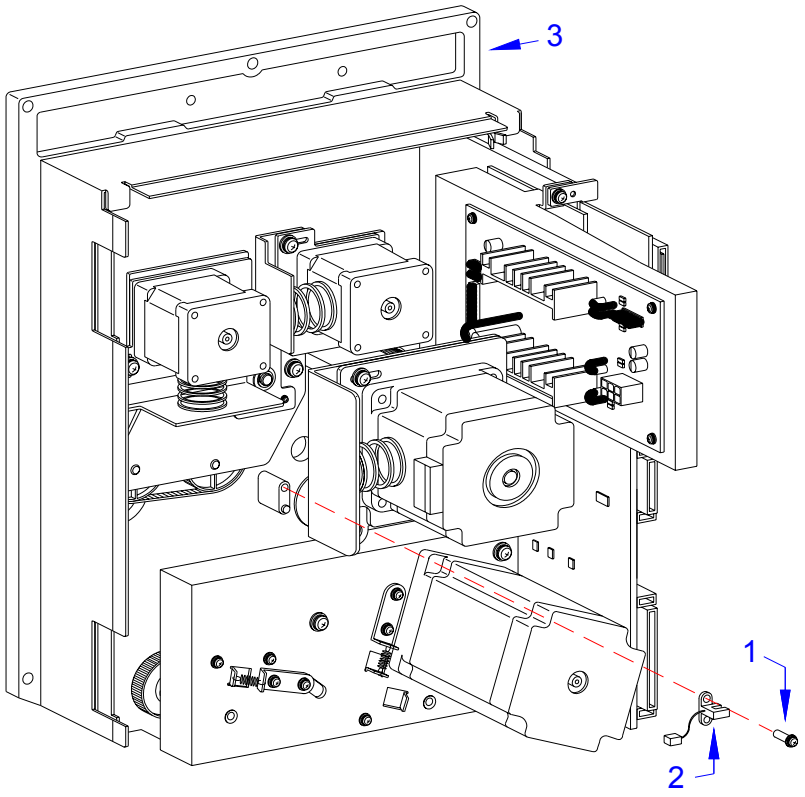


Figure 7-22, Ribbon-Saver Sensor Replacement

COVER-OPEN SWITCH REPLACEMENT (DIRECT LOAD)

The cover-open switch disables the printer if the printer's front cover is not fully closed. The switch is spring loaded and is depressed when the front housing cover is closed, prompting a signal to be transmitted to the processor. The processor in turn, relays a signal to the panel board.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the printer's front housing cover and remove ribbon stock from printer.
3. Remove two screws (1, Figure 7-23) securing cover (2) to the printer. Manipulate cover (2) from printer.
4. Remove two screws (3) securing defective switch (4) to the printer.
5. Disconnect wiring harness (not shown) from defective switch (4) and connect to replacement switch (4).
6. Secure replacement switch (4) to the printer using two screws (3).
7. Manipulate cover (2) into the printer so as to cover switch (4) and its wiring harness (not shown).
8. Secure cover (2) using two screws (1).

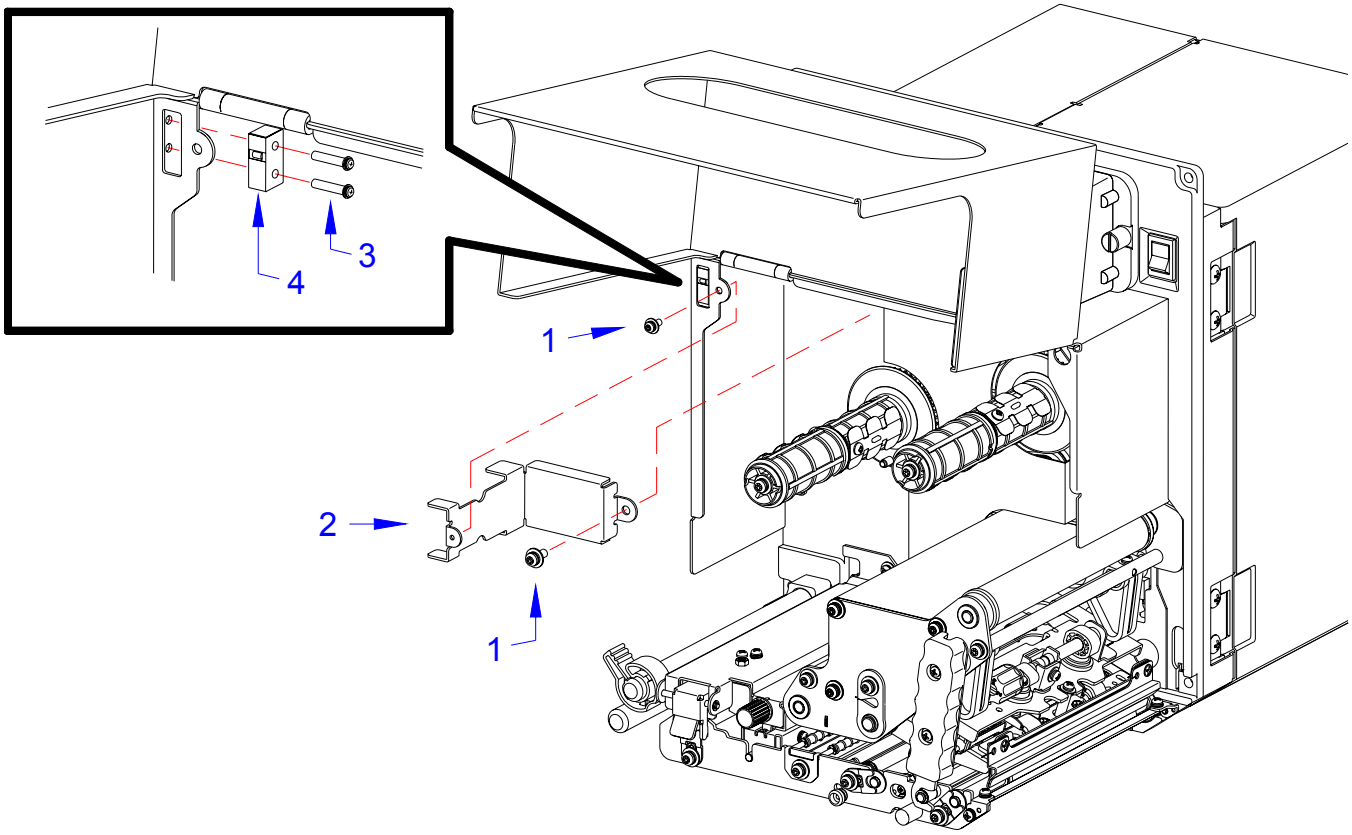


Figure 7-23, Cover-Open Switch Replacement (Direct Load)

FUSE REPLACEMENT

The fuse is wired to the power receptacle through the main circuit board and protects the printer from power surges from the electrical source. If a surge of electricity reaches the fuse, its filiment will melt creating a disruption of the flow. In order to bridge the gap so the printer may again be functional, the damaged fuse must be replaced.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the rear housing covers to access power board (1, Figure 7-24).

NOTE: Figure 9-1 of the Appendix unit displays cover open or removal.

CAUTION: OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Detach defective fuse (2) from power board (1) and insert replacement fuse (2) in its place.

NOTE: The orientation of the fuse does not matter. It only has to be installed into its respective cylinder and be able make contact on each end to function.

NOTE: Fuse amperage and voltage rating may be found stamped into the fuse's metal contacts or labeled on the printer's rear.

CAUTION: IMPROPER FUSE USAGE MAY RESULT IN DESTROYED ELECTRICAL COMPONENTS AND/OR FIRE. ENSURE THE DAMAGED FUSE IS REPLACED WITH ONE OF IDENTICAL PHYSICAL DIMENSIONS AND AMPERAGE. TO DO THIS, DUPLICATE THE INFORMATION STAMPED ON THE FUSE'S METAL CASING.

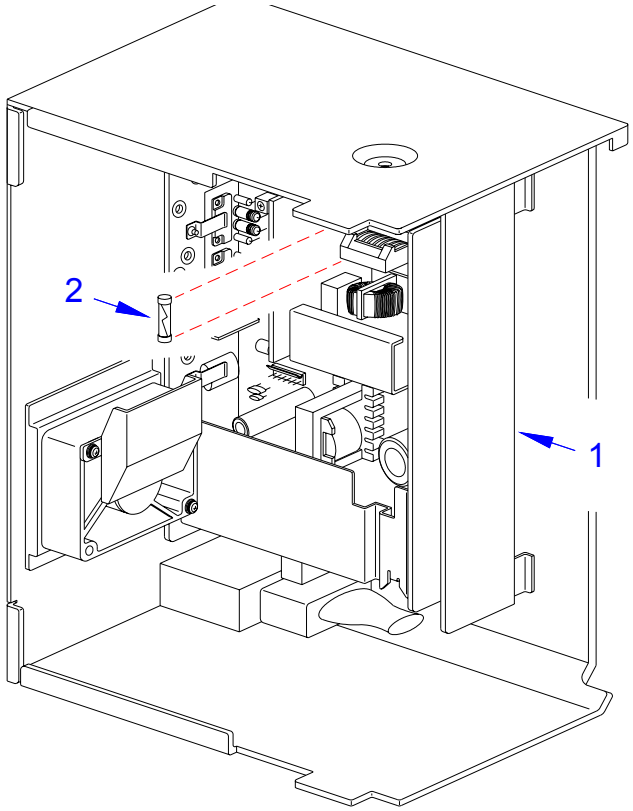


Figure 7-24, Fuse Replacement

FAN REPLACEMENT

The fan assmbly is used to prevent the printer's internal components from overheating.

1. Switch off the printer and observe applicable lockout-tagout procedures.
2. Open the printer's rear housing covers.

> NOTE: Figure 9-1 of the Appendix unit displays cover open or removal.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3. Remove two screws (1, Figure 7-25) securing air deflector (2) and fan (3) to the printer.
4. Disconnect wiring harness (not shown) from defective fan (3) and connect replacement fan (3).
5. Secure replacement fan (3) and air deflector (2) to the printer using two screws (1).

> NOTE: A properly installed air deflector will be oriented upward.

6. Close rear housing covers, restore power, and operate printer to ensure proper function.

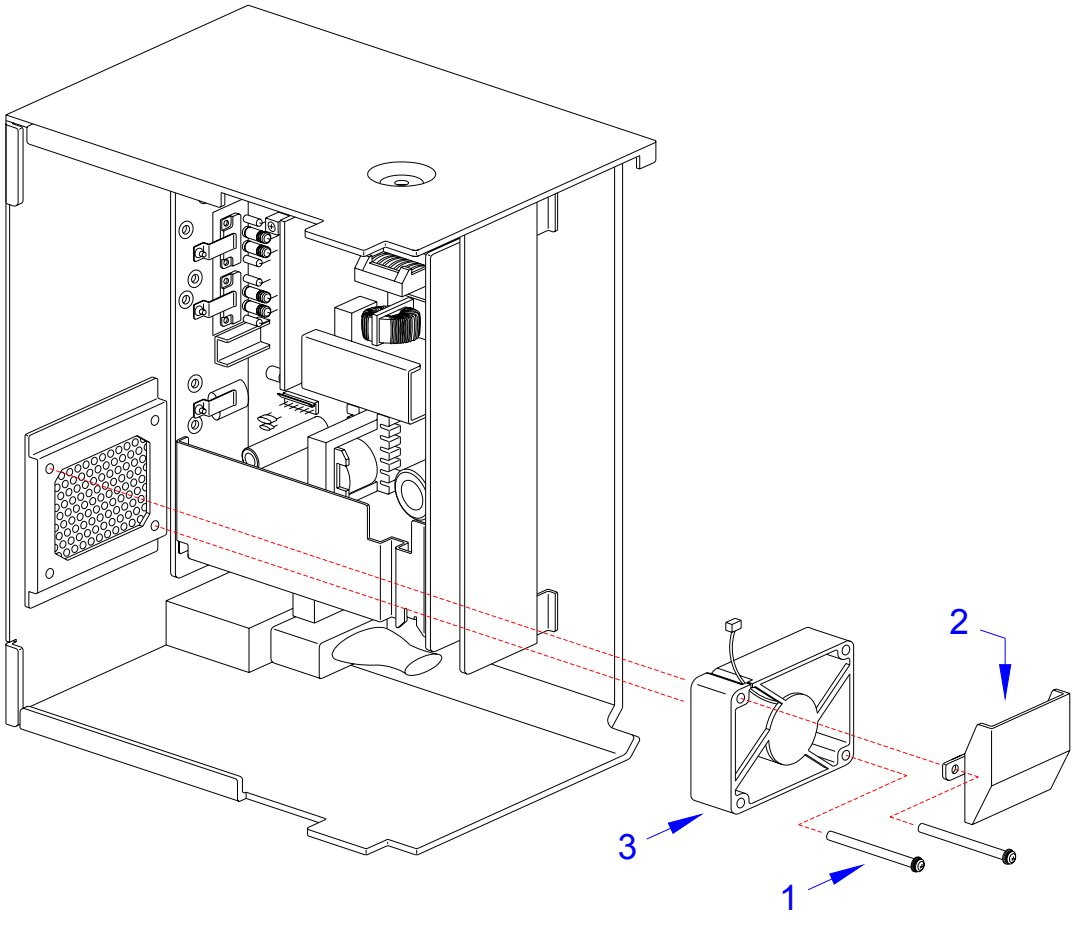


Figure 7-25, Fan Replacement

FAN FILTER REPLACEMENT

The fan filter prevents atmospheric debris from being drawn into the printer adversely affecting component performance. The filter is adhesive on the contact side. To install, simply remove the contaminated filter, peel away the adhesive paper backing, and apply over the fan exhaust holes. Refer to Figure 7-26 for guidance.

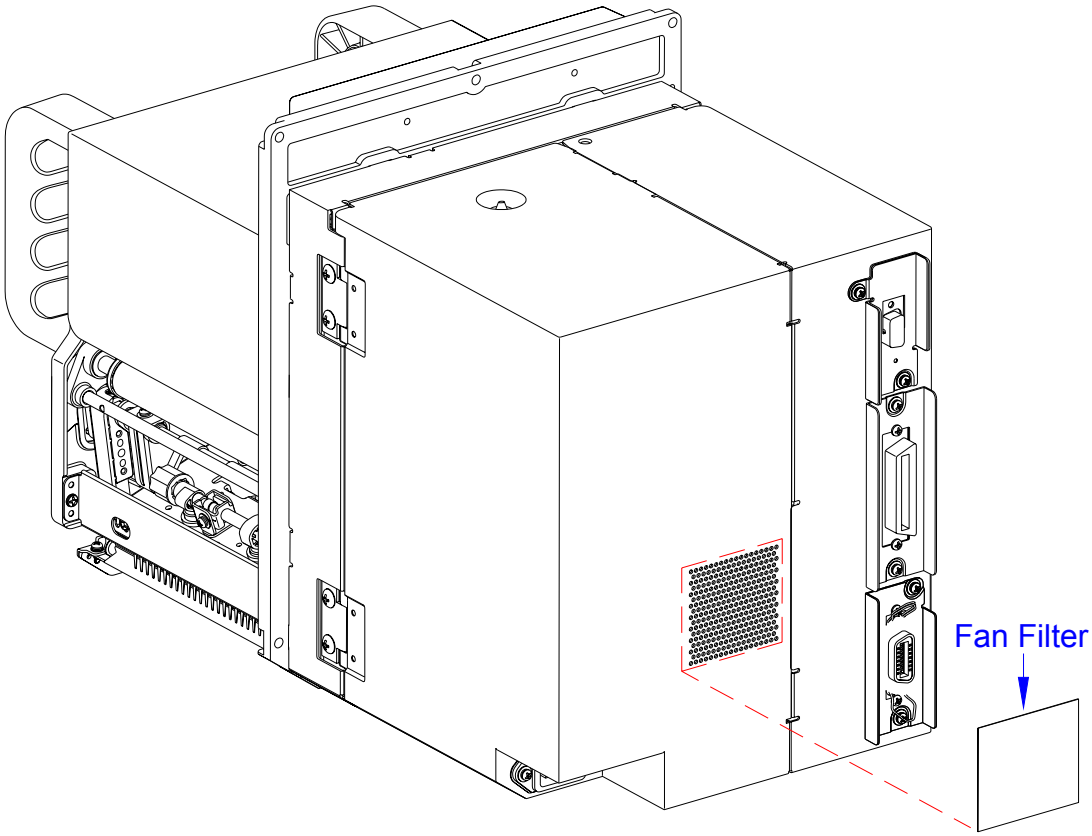


Figure 7-26, Fan Filter Replacement

8

ADJUSTMENT PROCEDURES

- Label Sensor Positioning
- Print Head Pressure
- Print Head Alignment
- Ribbon Guide Alignment
- Media Pressure Roller Balance
- Printer Belt Tensioning
- Ribbon Cassette Belt Tensioning
- Eye-Mark Sensor Penetration
- Gap Sensor Penetration
- Operational Adjustments

LABEL SENSOR POSITIONING

The label sensor assembly provides a mounting apparatus for the eye-mark, gap, and paper-end sensors. The position adjustment for standard label media is 0mm (the inner most position). Zero (0mm) is the default setting.

When non-standard media is used, the label sensor must be adjusted to align with media's reference mark. The adjustment range for eye-mark sensor usage is 45.0 to 65.5mm, and the gap sensor adjustment range is 5.0 to 66mm. The sensor adjustment scale is in 5mm increments.

1 Open the front housing cover or remove the ribbon cassette to access print assembly (1, Figure 8-1).

2 Lift upward on print head latch (2) to disengage the print head as required.

3 Lift upward on label sensor latch (3) to hinge open the upper half of label sensor assembly (4).

4 Place label media (5) face-up and laterally onto printer chassis (6). Relatch label sensor assembly (4).

5 Find label sensor adjustment knob (7) located behind print assembly (1).

> NOTE: The label sensor adjustment knob is purple colored ABS plastic.

6 Manually rotate knob (7) to the left or right as required to properly position label sensor (8).

> NOTE: Sensor positioning may also be achieved by measuring from the printer's center frame outward to the specified distance for sensor/reference mark alignment. Refer to Figure 9-3 in the Appendix unit of this manual for applicable dimensions.

7 Test print a label to determine if label sensor (8) is properly aligned.

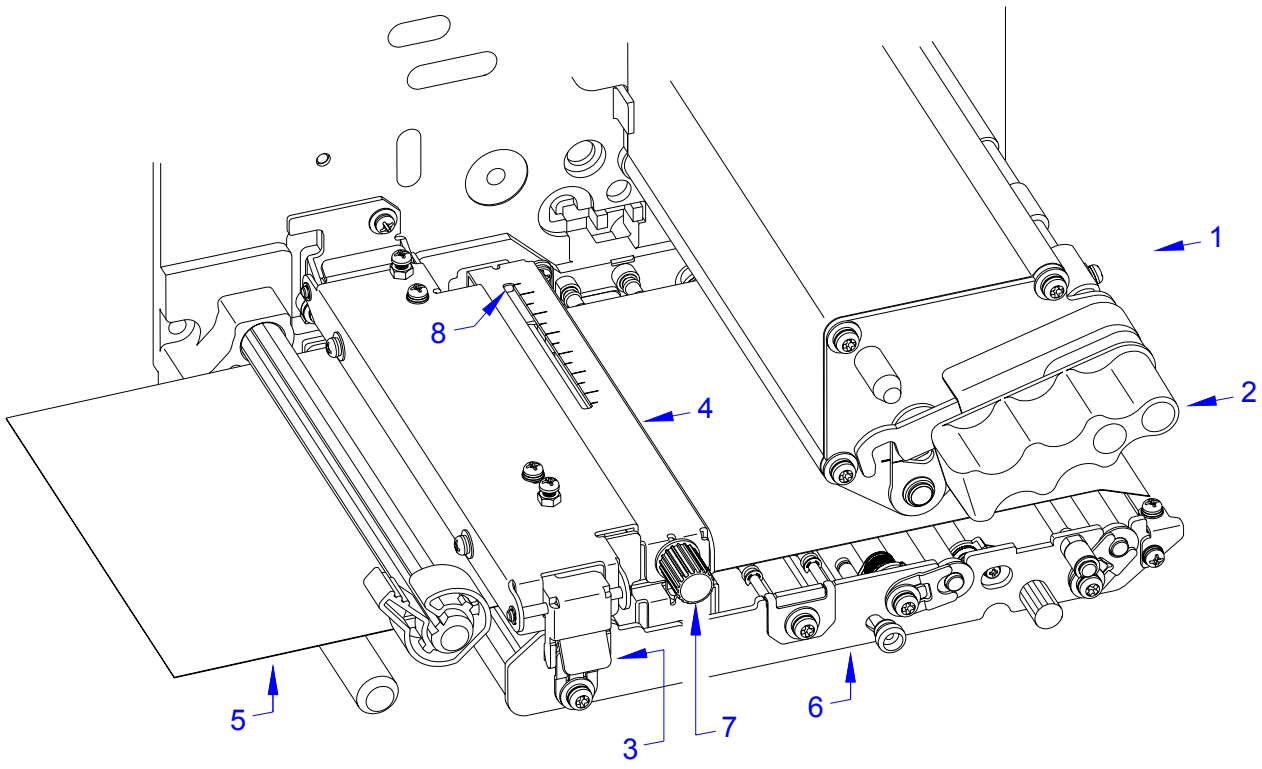


Figure 8-1, Label Sensor Positioning

PRINT HEAD PRESSURE

Print head pressure is the equalization of pressure against the platen roller from one end to the opposite. If the print head balance is out of adjustment, the printed image will be darker on one side of the label than the other and the media will be prone to travel in the direction of least resistance.

The adjustment of print head pressure is achieved through the adjustment of a four-position dial located within the print assembly just above the print head. The end of the dial is inumerated 1 through 4.

To adjust the pressure, begin test printing and slightly loosen set screw (1, Figure 8-2). Then rotate dial (2) to each position and monitor printing characteristics for each position. Optimum pressure is achieved by the disappearance or reduction of prevailing negative print characteristics. Retighten set screw (1) when the best dial position is chosen.

NOTE: For reference purposes, the embossed number on the dial's end that is positioned closest to the print head is the dial setting.

NOTE: If the dial is too difficult to manually adjust using fingertips. A slotted screwdriver may be inserted into its end for easier dial rotation.

ATTENTION: If some print problems persist, the print head alignment may require adjustment. Following print head alignment, the print head balance may require a different setting and the procedure repeated.

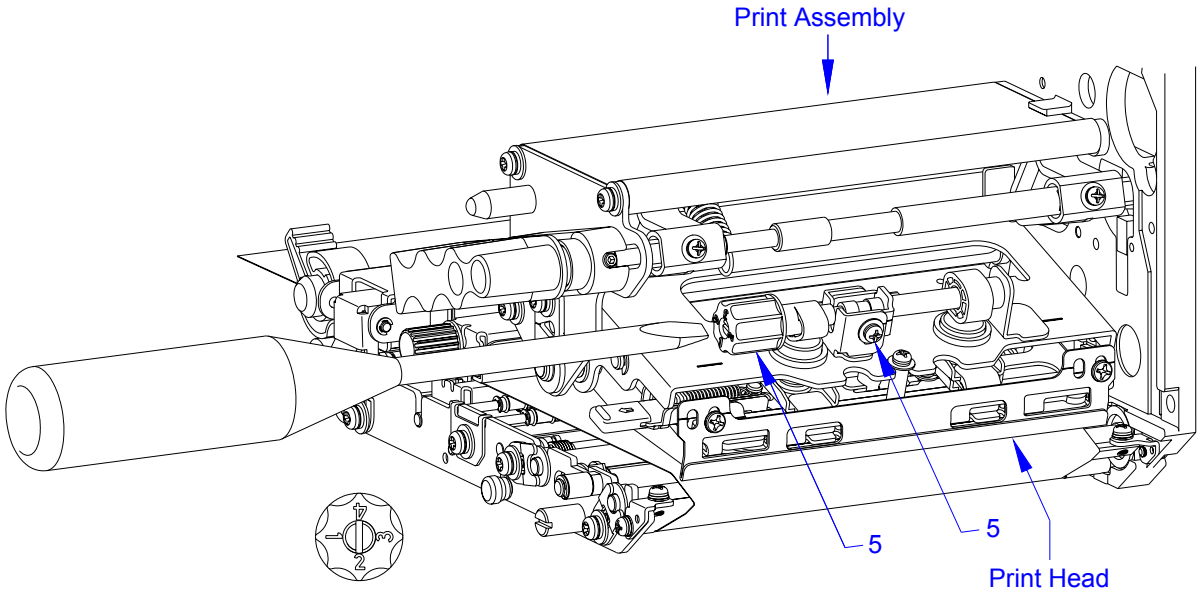


Figure 8-2, Print Head Pressure Adjustment

POSITION	1		2		3		4	
Pressure	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside
	2.5kg	2.5kg	3.0kg	3.0kg	2.5kg	2.5kg	3.0kg	2.0kg
Label Width	30mm to 128mm		30mm to 128mm		10mm to 30mm		10mm to 30mm	
Label Thickness	0.05mm to 0.20mm		0.20mm to 0.31mm		0.05mm to 0.20mm		0.20mm to 0.31mm	

PRINT HEAD ALIGNMENT

Print head position has a direct impact on print quality. The print head must be parallel with the platen roller for the printed image to be consistent across the label.

1 Ensure the print head is latched.

2 Look downward to print head (1, Figure 8-3) to locate head alignment plate (2).

3 Ensure the values of alignment scales (A) and (B) are the same.

> NOTE: If the scale values are not the same, this may be the cause of print quality issues. However, matching scale values does not ensure proper alignment. If the scales do not match, follow this procedure to align the scales, reprint, and then readjust as deemed necessary.

4 Determine which end of alignment plate (2) should be adjusted and loosen its relative set screw (5) or (6).

5 Adjust alignment plate (2) then retighten relative set screw (5, 6) while maintaining plate (2) position.

> NOTE: There is an adjustment aperture (C, D) in alignment plate (2) where an object may be inserted to assist in adjustment. An appropriately sized Standard screwdriver works best.

6 Test print a label to determine if print head (2) is properly aligned.

7 Repeat this procedure until proper alignment is achieved.

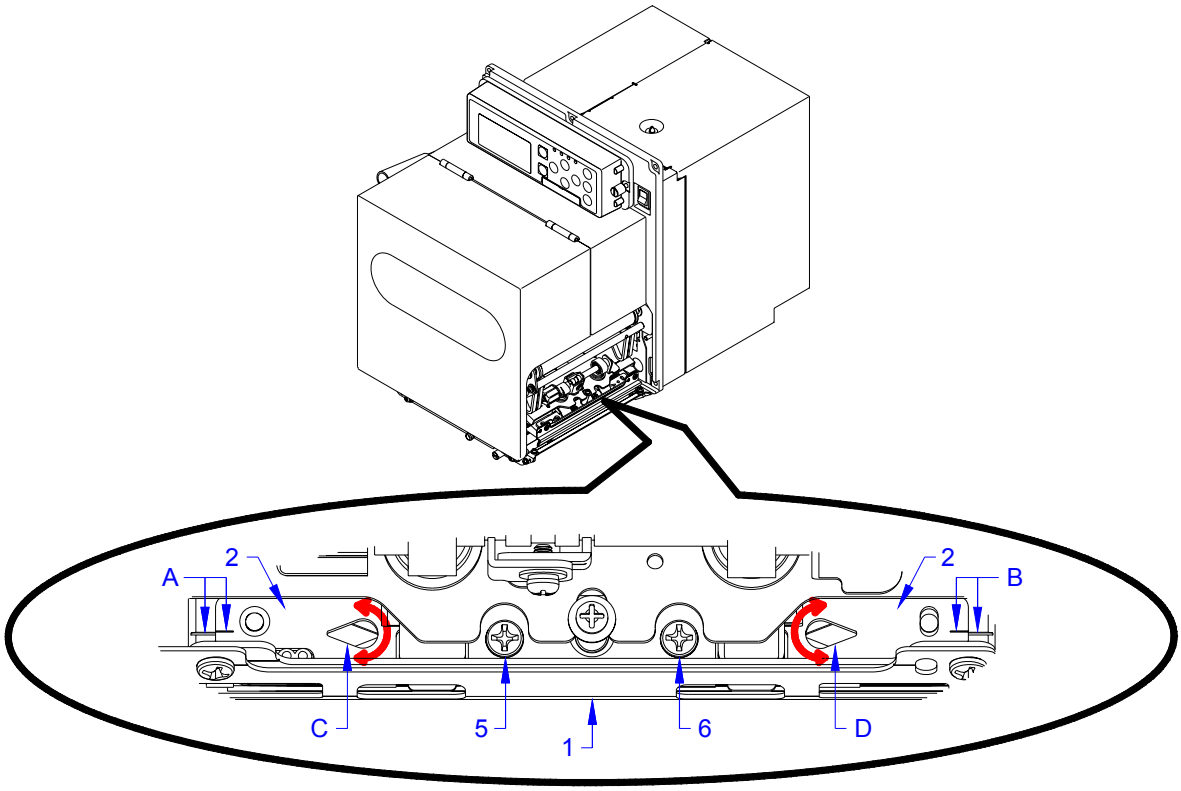


Figure 8-3, Print Head Alignment

RIBBON GUIDE ALIGNMENT

If the print ribbon is not spread smoothly over the print head when it makes contact with the media, print voids will occur at the point of the ribbon fold. Typically, this is the result of the axis of one of the following not being perfectly parallel with the platen roller: ribbon spindle, print head, or ribbon guide.

The purpose of the adjustable ribbon guide is to compensate for the axis deviations of the other two. By adjusting the ribbon guide proportionally to the degree of deviation, the ribbon spreads smoothly as it travels from the ribbon supply spindle, to the guide, and beyond.

Ribbon guide adjustment is a trial and error activity that requires the pause of printing, unlatching of the print head, adjusting the guide, relatching the print head, and printing once again. Several labels must be printed following each adjustment to determine if the adjustment was effective.

The ribbon guide is secured to the face of the print assembly by a screw on each end. Before adjusting the guide, visually inspect that its axis is parallel with that of the print assembly. If not, adjust accordingly, ensure the set screws are secure, and once again commence printing. By starting in a neutral position, either end may be adjusted vertically as necessary to remedy the wrinkling problem.

1 Test print a label to ensure the print head is properly balanced and aligned.

> NOTE: Refer to their relative procedures within this manual for guidance on Print Head Balance and Print Head Alignment.

2 Disengage the print head latch.

3 Loosen one of the two set screws (1, Figure 8-4) and move the free end of ribbon guide (2) upward or downward as necessary until the ribbon appears to unwrinkle.

4 Retighten loose set screw (1) while holding ribbon guide (2) in place.

5 Engage print head latch, close cover, and test print a label.

6 Repeat steps 2 through 5 until proper alignment is achieved.

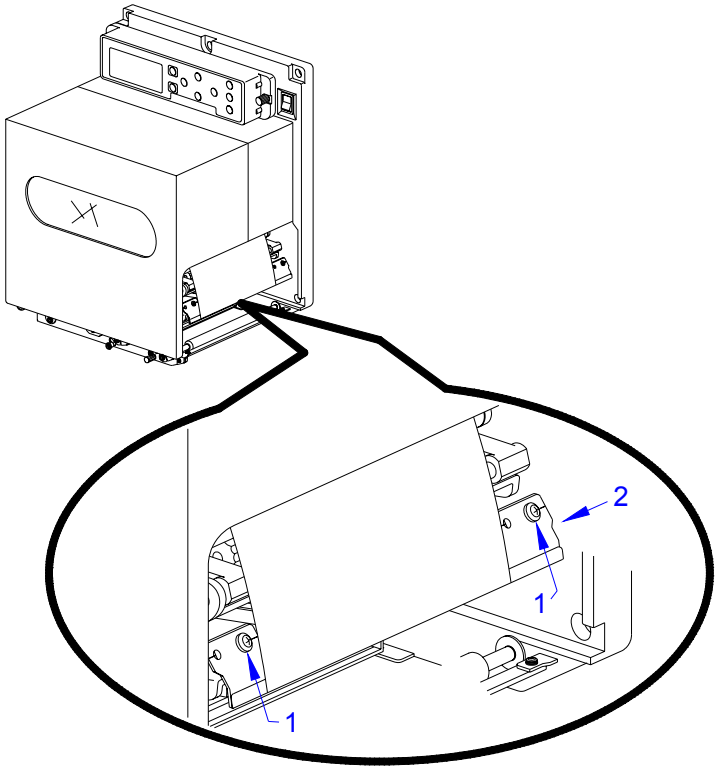


Figure 8-4, Ribbon Guide Alignment

MEDIA PRESSURE ROLLER BALANCE

Pressure roller balance adjustment may be required if the media is inclined to meander at the printer's rear to one side. When all things are properly aligned and balanced, the media will continuously feed from the printer's rear, through to its front without lateral movement creating resistance on its left or right sides.

Before adjusting the pressure rollers, ensure the media roll is harmoniously positioned and aligned so that it may flow perfectly parallel to the printer. Next, ensure the printer's print head is properly aligned and balanced. If all other conditions are confirmed to be adequate and the media's edge is still dragging against either the printer's center wall or the media guide, then adjust the pressure roller balance.

These pressure rollers are spring loaded on each end and embedded in the label sensor assembly. By adjusting the setscrew on either end downward, the pressure on that end is increased. Likewise, an adjustment of a setscrew upward on either end, reduces pressure on that side.

To adjust pressure roller balance, loosen the locknut on given side and adjust the relative setscrew to increase or decrease pressure as deemded appropriate. When the desired outcome is achieved, hold the setscrew in position while tightening its locknut.

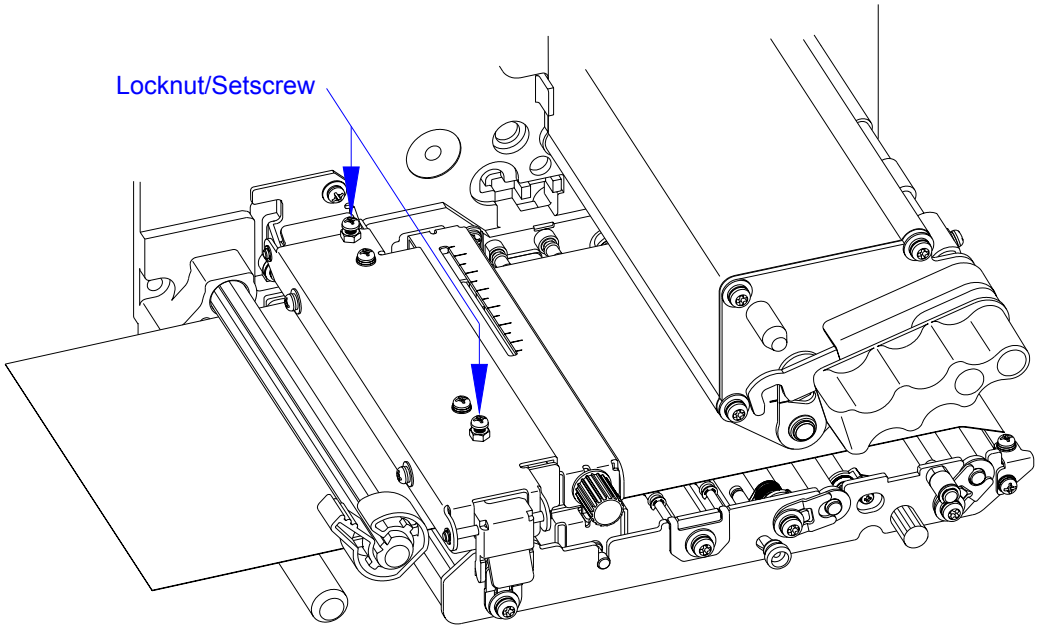


Figure 8-5, Media Pressure Roller Balance

PRINTER BELT TENSIONING

The printer incorporates the use of timing belts that transfer torque from various drive motors to individual print mechanisms. Each timing belt has a spring loaded adjustment feature so that manual adjustment is not required. Simply loosen the applicable screws to allow spring torsion to determine the degree of tension, then retighten the loosened screw to secure their position.

The colorized screws in Figure 8-6 identify the setscrews to be loosened and retightened for belt tensioning of the mechanisms identified.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

CAUTION: EXCESSIVE BELT TENSION WILL CREATE UNDESIRABLE DRAG ON THE DRIVE TRAIN. A PROPERLY ADJUSTED BELT WILL POSSESS JUST ENOUGH TENSION TO PREVENT SLIPPAGE.

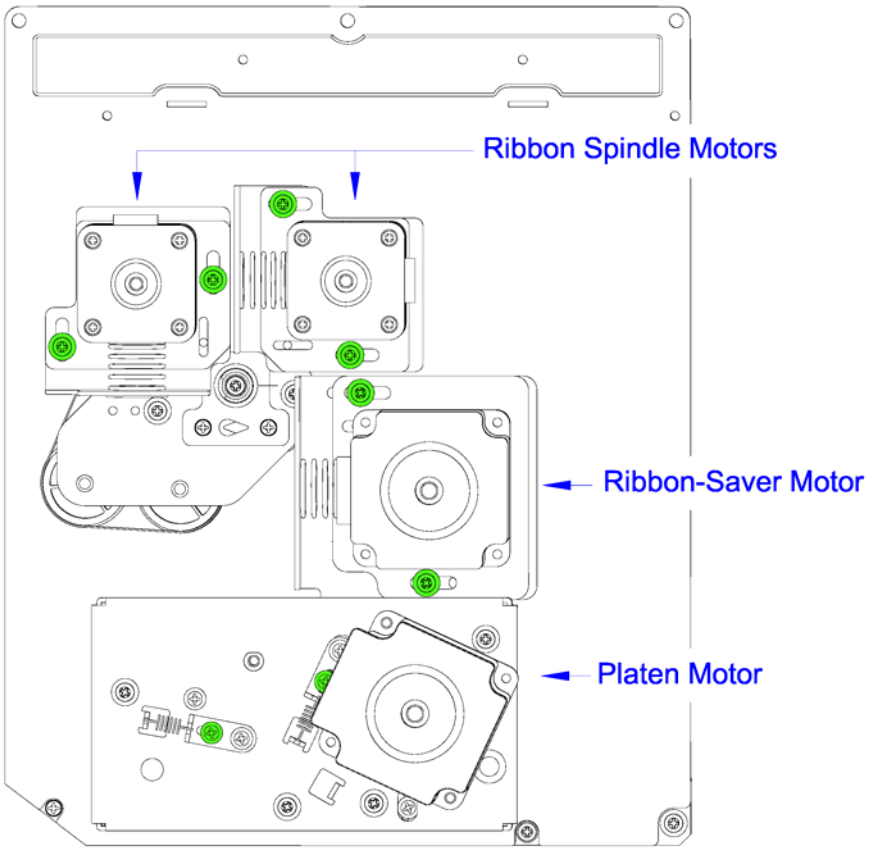


Figure 8-6, Printer Belt Tensioning

RIBBON CASSETTE BELT TENSIONING

The ribbon cassette timing belt has a spring loaded adjustment feature so that manual adjustment is not required. Simply loosen the applicable screw to allow spring torsion to determine the degree of tension, then retighten the loosened screw to secure its position.

The colorized screw in Figure 8-7 identifies the setscrew to be loosened and retightened for belt tensioning.

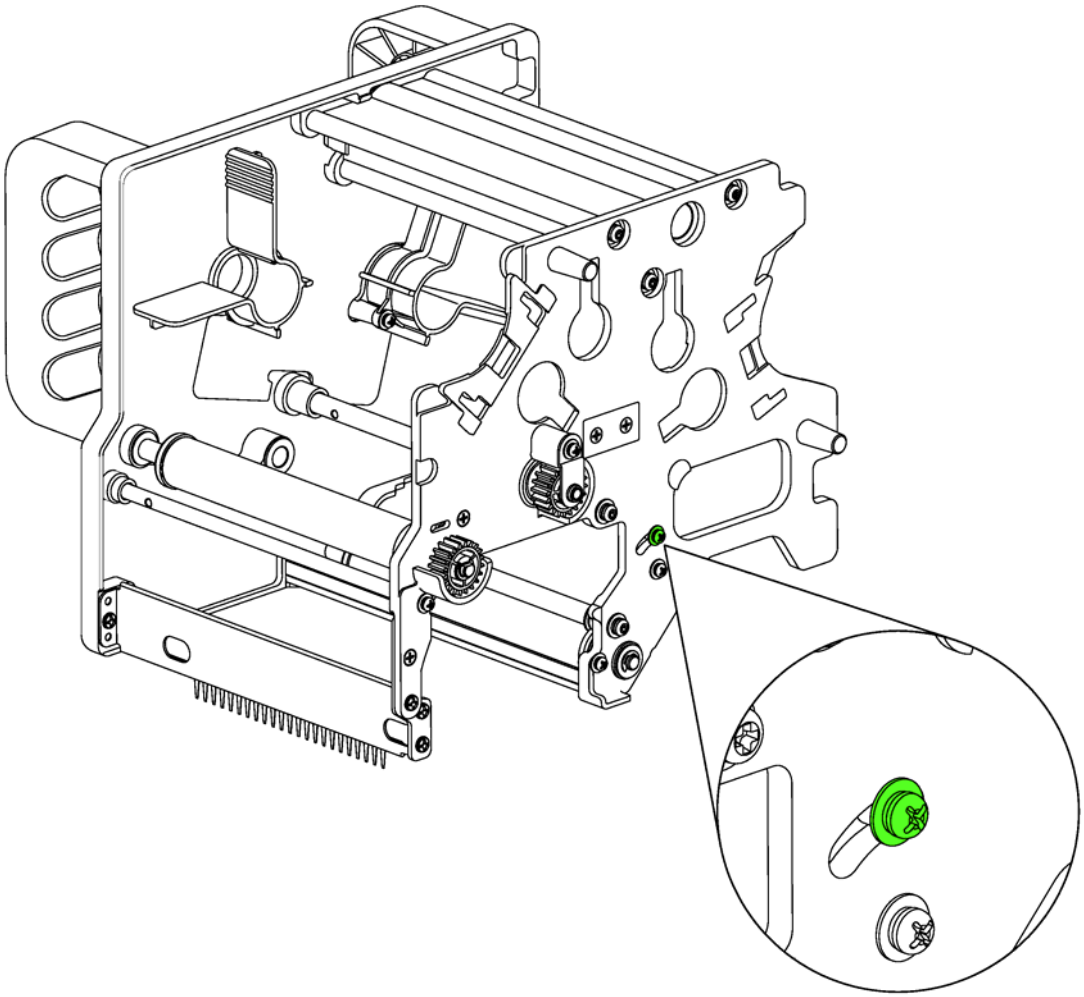


Figure 8-7, Ribbon Cassette Belt Tensioning

PRINT HEAD BALANCE

Print head balance is the equalization of pressure against the platen roller from one end to the opposite. If the print head balance is out of adjustment, the printed image will be darker on one side of the label than the other and the media will be prone to travel in the direction of least resistance.

The adjustment of print head balance on the label can be subjective. One will know when balance is achieved by the disappearance of prevailing negative characteristics.

To adjust the balance, begin test printing, slightly loosen set screw (1, Figure 8-8), and slightly move the adjustment plate (2) upward or downward as necessary. Retighten set screw (1) while holding the adjustment plate (2) when proper printing is achieved.

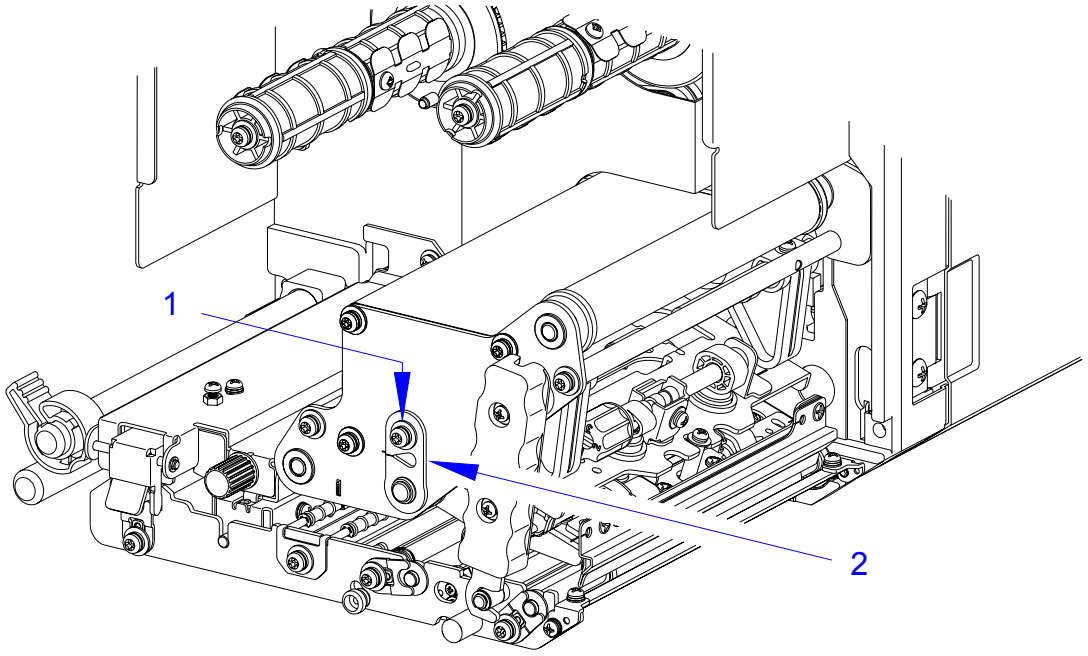


Figure 8-8, Print Head Balance Adjustment

PRINT HEAD DPI CHANGE

The alteration of the printer to accomodate a print head with a different DPI (Dots Per Inch), a mechanical adjustment is required in addition to a configuration change through the printer's operator panel. The mechanical adjustment required, is the alternate routing of some timing belts of the platen motor assembly. To achieve this, the platen motor assembly must be removed to gain access to the relative timing belts.

1 Swtich off the printer and observe applicable lockout-tagout procedures.

2 Remove all interface cards and open the rear housing covers.

> NOTE: Figure 9-1 of the Appendix unit displays opening the rear housing covers.

> **CAUTION:** OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN COMPONENT DAMAGE. ALWAYS REMOVE FIRST.

3 Remove two screws (1, Figure 8-9) and one screw (2) securing platen motor asembly (3) to frame (4).

4 Move aside five ground cables (not shown) and withdraw platen motor assembly (3) from printer.

5 Loosen set screw (5) to release belt tensioner (6).

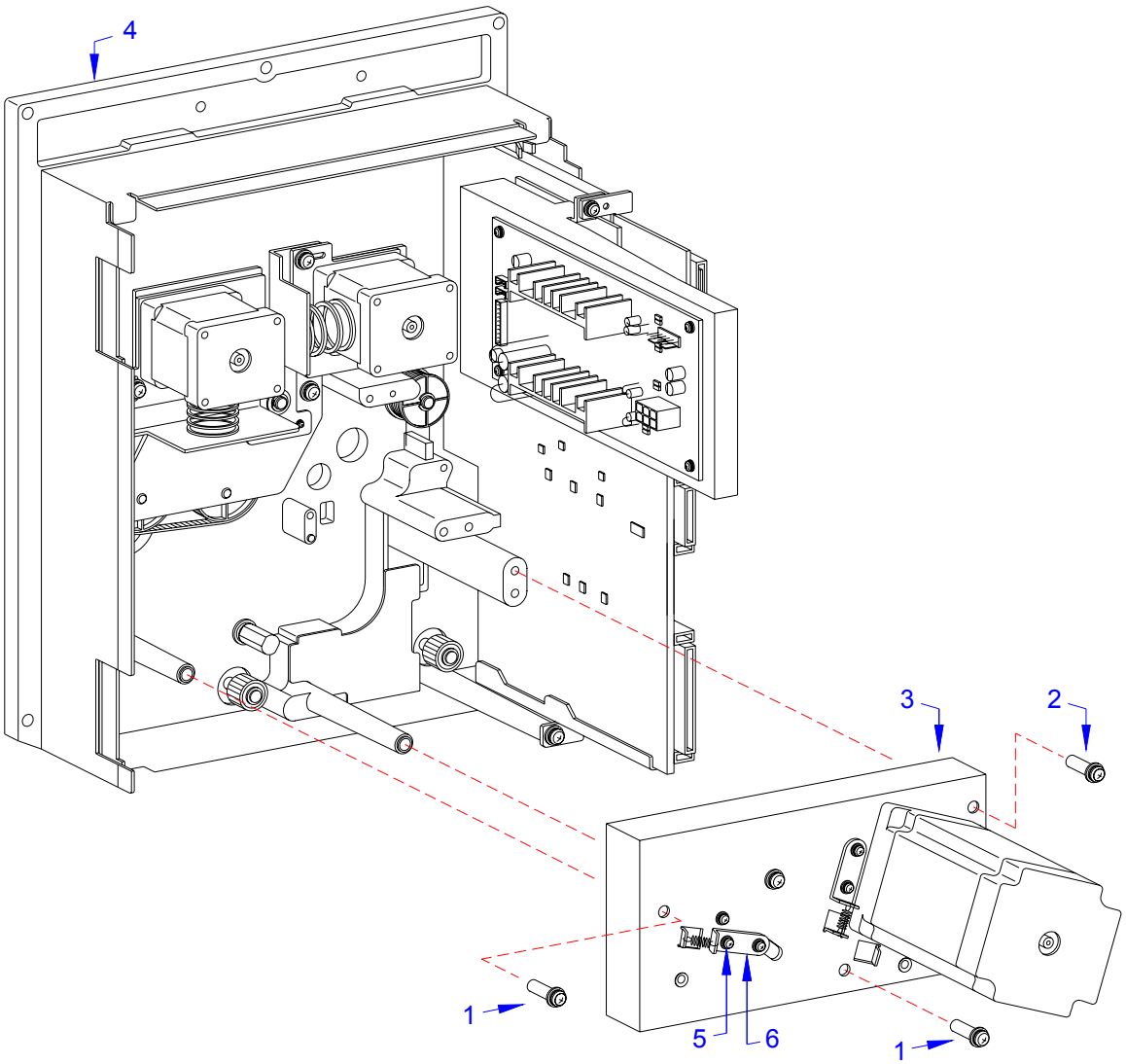


Figure 8-9, Print Head DPI Change

6 Move timing belt (7, Figure 8-10) to the orientation applicable for the desired print head resolution.

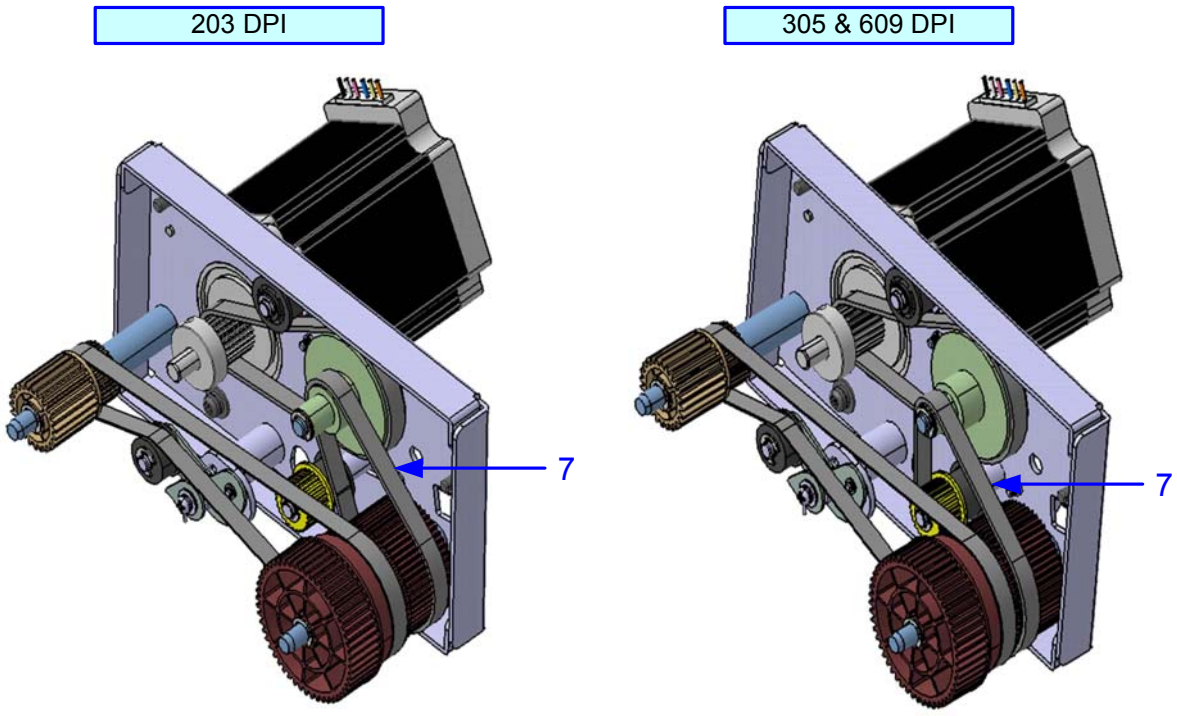


Figure 8-10, Print Head DPI Change

7 Adjust and hold belt tensioner (6, Figure 8-9) while tightening set screw (5).

> **CAUTION:** A PROPERLY TENSIONED BELT WILL BE JUST ENOUGH TO PREVENT SLIPPAGE. AN OVERLY TENSIONED BELT WILL EXCESSIVELY INCREASE DRAG ON THEIR PULLEYS AND INCREASE COMPONENT WEAR.

8 Insert platen motor assembly (3) to printer frame (4).

9 Secure the assembly (3) and five ground cables (not shown) using one screw (2) and two screws (1).

> NOTE: The three shorter ground cables are to be secured using the leftmost screw and the two longer ground cables are to be secured using the middle screw.

10 Close the rear housing covers.

11 Relpace the print head as directed in the Replacement Procedures unit.

12 Restore power and configure printer for head change.

13 Load printer with media and ribbon as applicable. Test print a label to ensure proper function.

> NOTE: The print head configuration menu screens will appear when the printer is powered on.

EYE-MARK/PAPER-END SENSOR SENSITIVITY

This sensor adjustment regulates penetrating ability for media referencing. For proper performance, the sensor must have a voltage difference greater than 0.8V between high and low. If performing the following procedure does not result in acceptable voltage levels, clean the window over the sensor's eye.

1 Load printer with label media so the white backing paper may be registered by the eye-mark sensor. Power on the printer.

2 Using the printer's operator panel, access the Service Mode and then proceed to the Level Offset menu screen (Figure 8-11).

3 Using the printer's operator panel, adjust the level offset so the sensor level reading is above 1.0V.

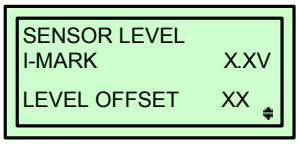


Figure 8-11, Level Offset Menu Screen

4 Manually position the media so that its eye-mark may be registered by the sensor.

5 Read the sensor level now displayed to ensure this reading is below 0.5V and the high value that was previously registered is at least 0.8V greater than the low reading just read.

6 Add these readings and divide them by two. Record the result.

7 Advance to the Slice Level menu screen (Figure 8-12).

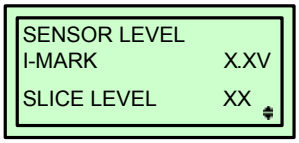


Figure 8-12, Slice Level Menu Screen

8 Read the slice level displayed to ensure the slice level is equal to this value.

9 Repeat steps 3 through 8 as required.

GAP SENSOR SENSITIVITY

This sensor adjustment regulates penetrating ability for media referencing. To establish penetration, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

For proper performance, the sensor must have a voltage difference greater than 0.8V between high and low. If performing the following procedure does not result in acceptable voltage levels, clean the window over the sensor's eye.

1 Load printer with label media (backing + label) so as to be registered by the gap sensor. Power on the printer.

2 Using the printer's operator panel, access the Service Mode and then proceed to the Level Offset menu screen (Figure 8-13).

3 Using the printer's operator panel, adjust the level offset so the sensor level is above 1.0V.

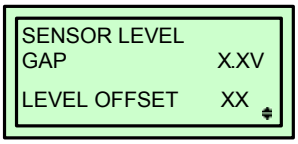


Figure 8-13, Level Offset Menu Screen

4 Peel a label from the paper backing and place the backing paper so that its gap may be registered by the sensor.

5 Read the sensor level now displayed to ensure this reading is below 0.5V and the high value that was previously registered is at least 0.8V greater than the low reading just read.

6 Add these readings and divide them by two. Record the result.

7 Advance to the Slice Level menu screen (Figure 8-14).

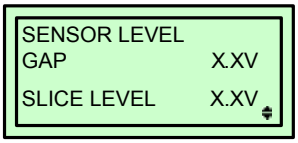


Figure 8-14, Slice Level Menu Screen

8 Read the slice level displayed to ensure the slice level is equal to this value.

9 Repeat steps 3 through 8 as required.

OPERATIONAL ADJUSTMENTS

These operational adjustments are for fine tuning the printer as necessary following the configuration process and are largely confined to the four potentiometers located on the operator panel. Refer to the table below for their function.

POTENTIOMETER	DESCRIPTION/PROCEDURE
PITCH	Is to be used in conjunction with the configuration adjustments. Make course adjustments there and then fine tune here. If unable to achieve the desired setting here, the course adjustment must be reset. Adjust this potentiometer as labels are being printed. Allow two labels to be printed for each adjustment to ensure a desired setting. Adjustment of the PITCH potentiometer will affect the print offset position.
OFFSET	The offset adjustment is used to reposition the media for printing following advancement for dispensing. A label is printed, it is fed forward for dispense, the printer retracts the remaining media (offset) to print the next label. To perform this adjustment: 1. Power On the printer. 2. Press the LINE key to place printer offline. 3. Advance to the User Mode and press FEED. 4. Adjust the OFFSET potentiometer. 5. Press the FEED key to feed another label. 6. Repeat steps 3 and 4 until desired offset is achieved. 7. Press the LINE key to bring the printer back online.
DARKNESS	Is used to adjust the darkness or lightness of the printed image and should be used in conjunction with the configuration adjustments. Make course adjustments there and then fine tune here. If unable to achieve the desired setting here, the course adjustment must be reset. Adjust this potentiometer as labels are being printed. Allow two labels to be printed for each adjustment to ensure a desired setting.

9

APPENDIX

- Cover Open Diagram
- Block Diagram
- Print Setup Dimensions
- Label Reference Position Diagram
- Label Adjustment Diagram
- Printer Connection Diagram
- Printer Loading Diagram
- Typical Applicator Process
- Printer Packing & Unpacking Diagram
- Ready/Busy Timing Charts
- X-On/X-Off Timing Charts
- Session Connect/Disconnect Diagram
- Printer Mounting Diagram
- Printer Dimensions (LH w/Cassette)
- Printer Dimensions (RH w/Cassette)
- Printer Dimensions (LH Direct Load)
- Printer Dimensions (RH Direct Load)
- Glossary

COVER OPEN DIAGRAM

CAUTION: OPENING THE REAR HOUSING COVERS WITH INTERFACE CARDS INSTALLED WILL RESULT IN DAMAGED COMPONENTS. ALWAYS REMOVE ALL INTERFACE CARDS PRIOR TO OPENING THE REAR HOUSING COVERS.

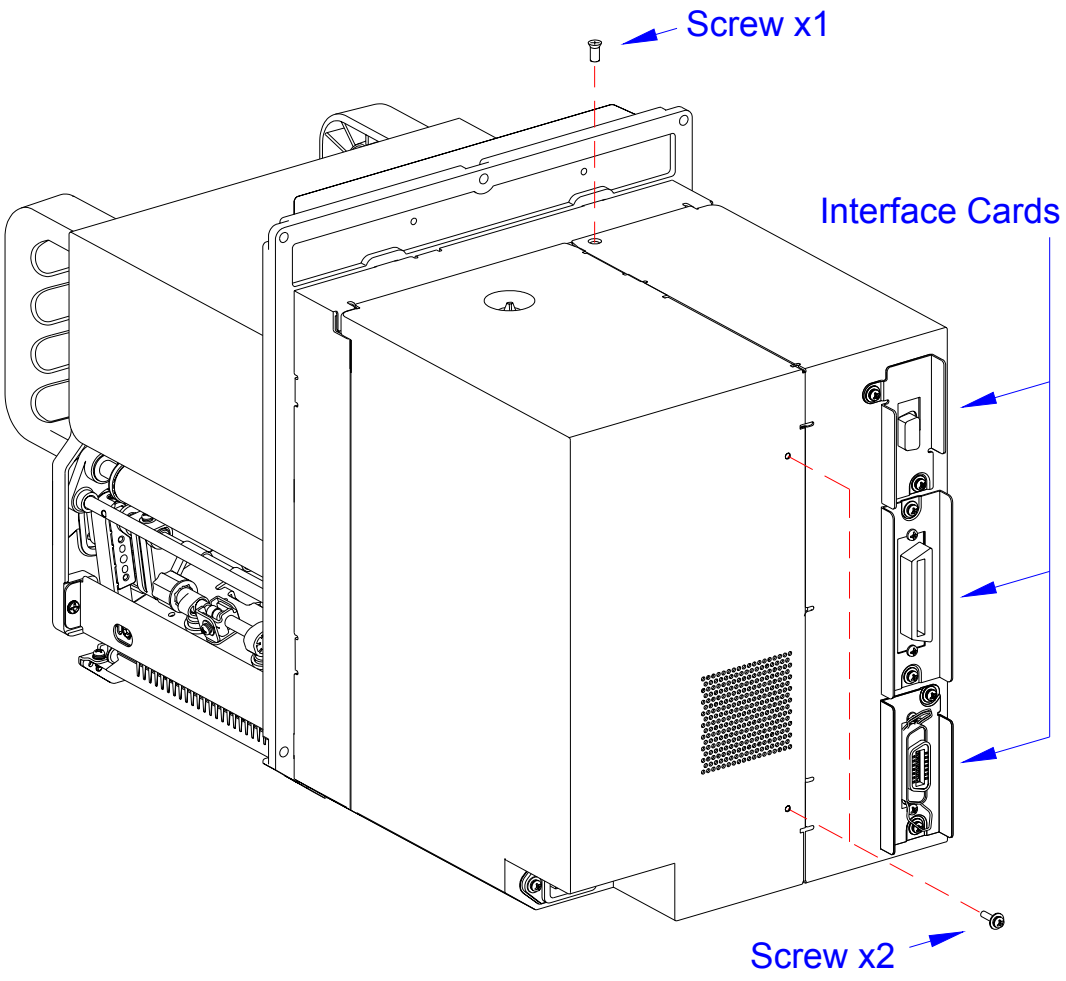


Figure 9-1, Cover Open Diagram

BLOCK DIAGRAM

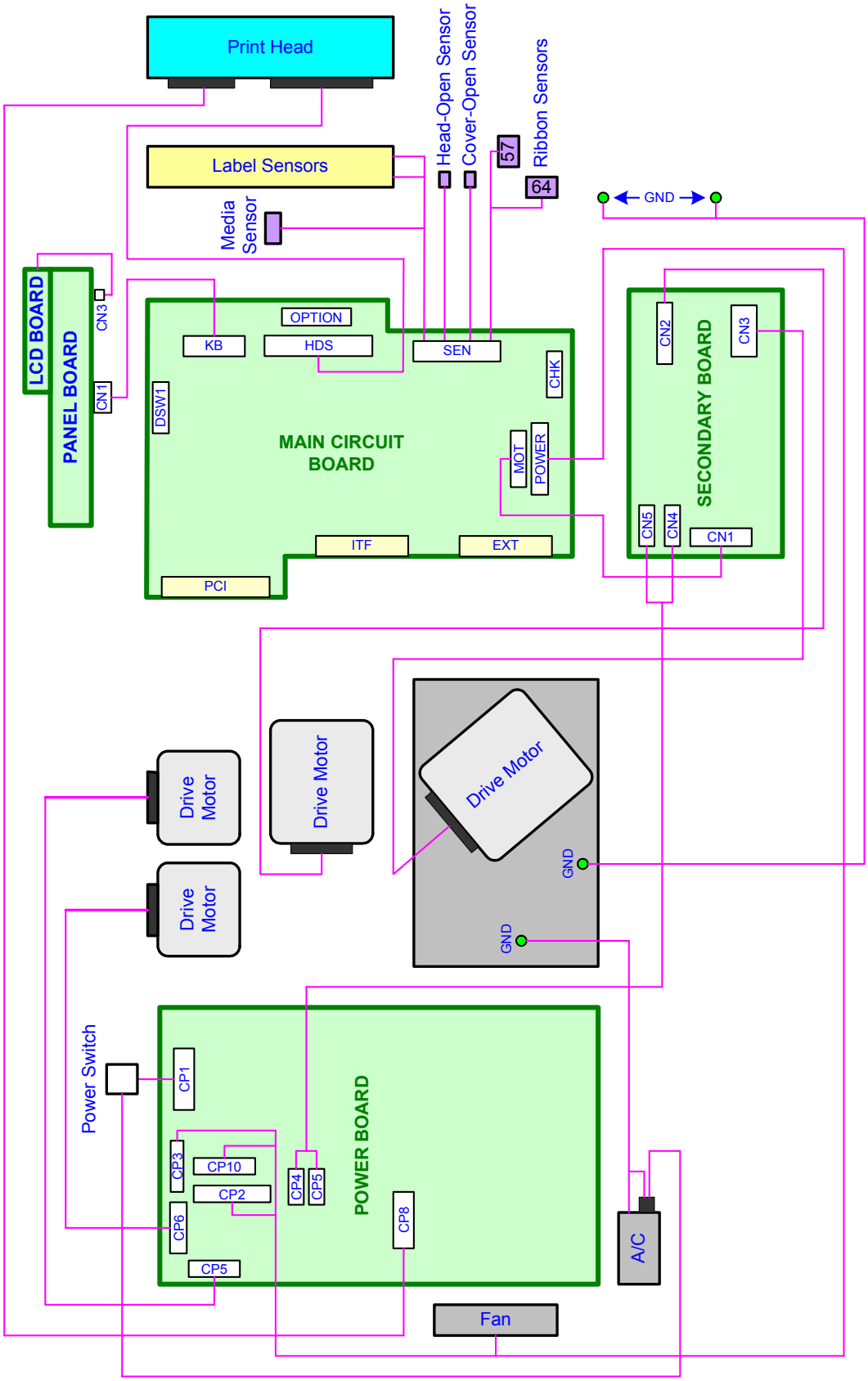


Figure 9-2, Block Diagram

PRINT SETUP DIMENSIONS

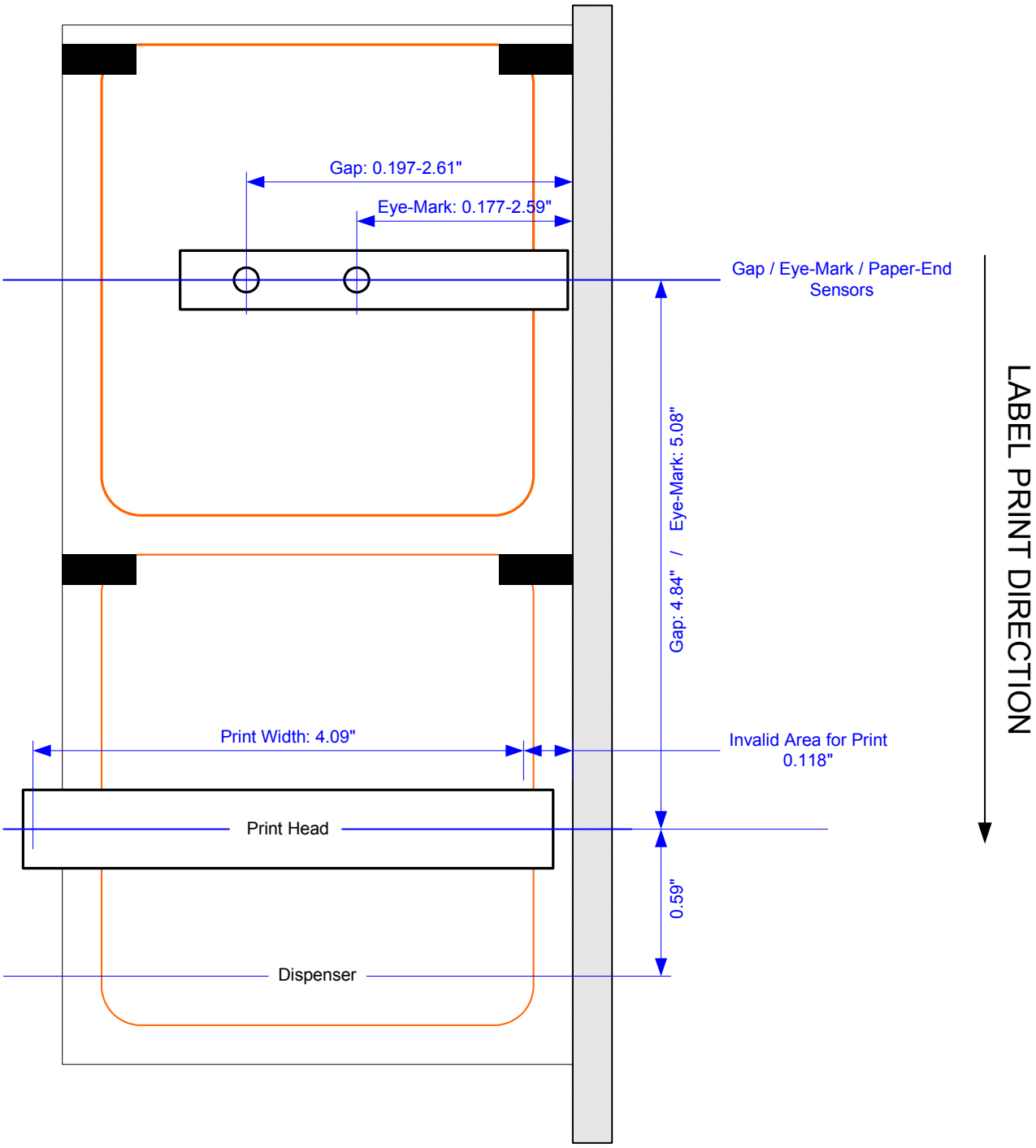


Figure 9-3, Print Setup Dimensions

LABEL REFERENCE POSITION

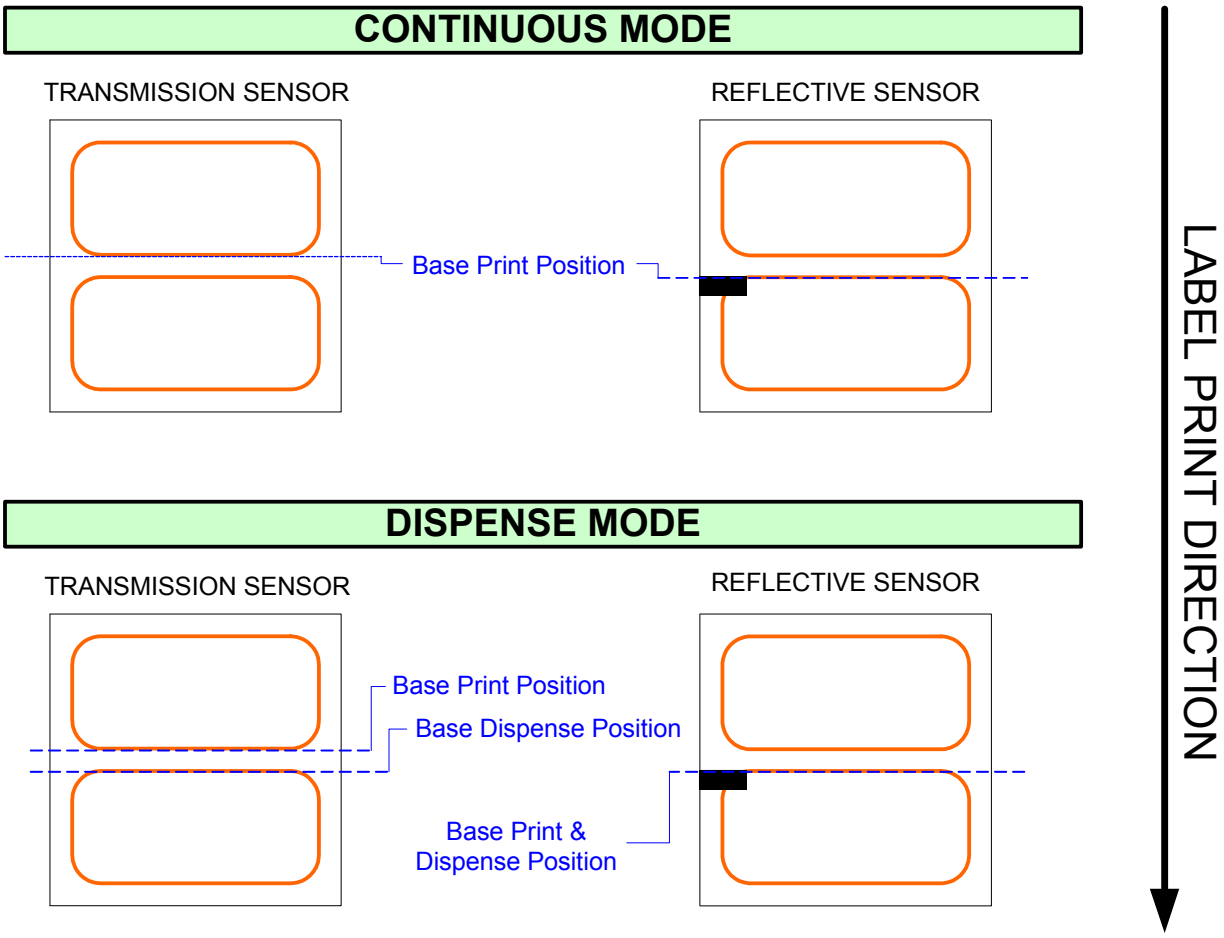


Figure 9-4, Label Reference Position Diagram

LABEL ADJUSTMENT DIAGRAM

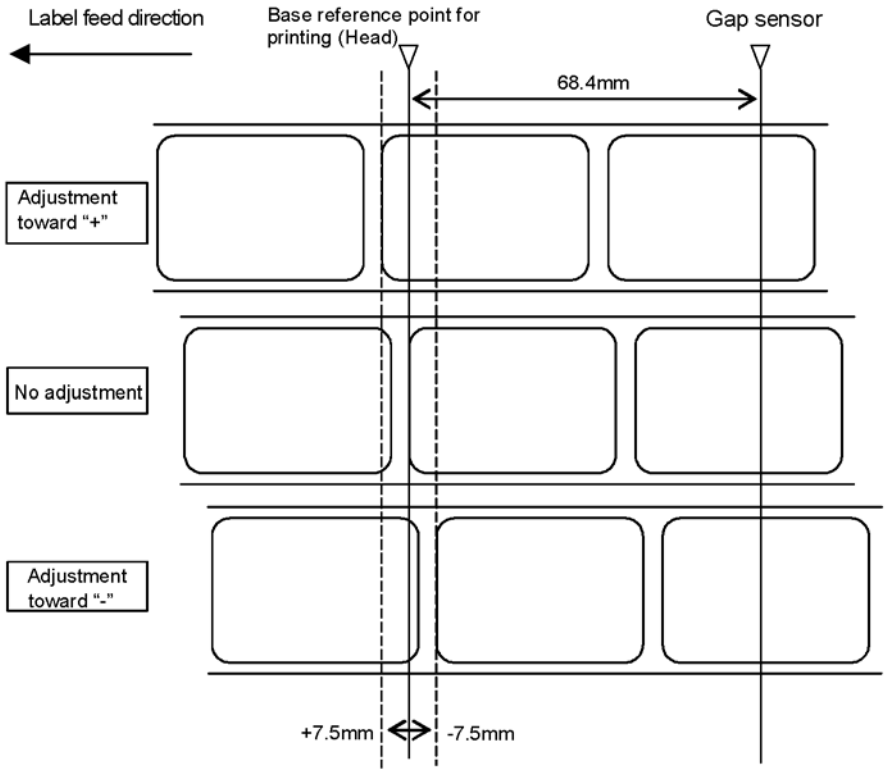


Figure 9-5a, Standard Position (Gap Sensor)

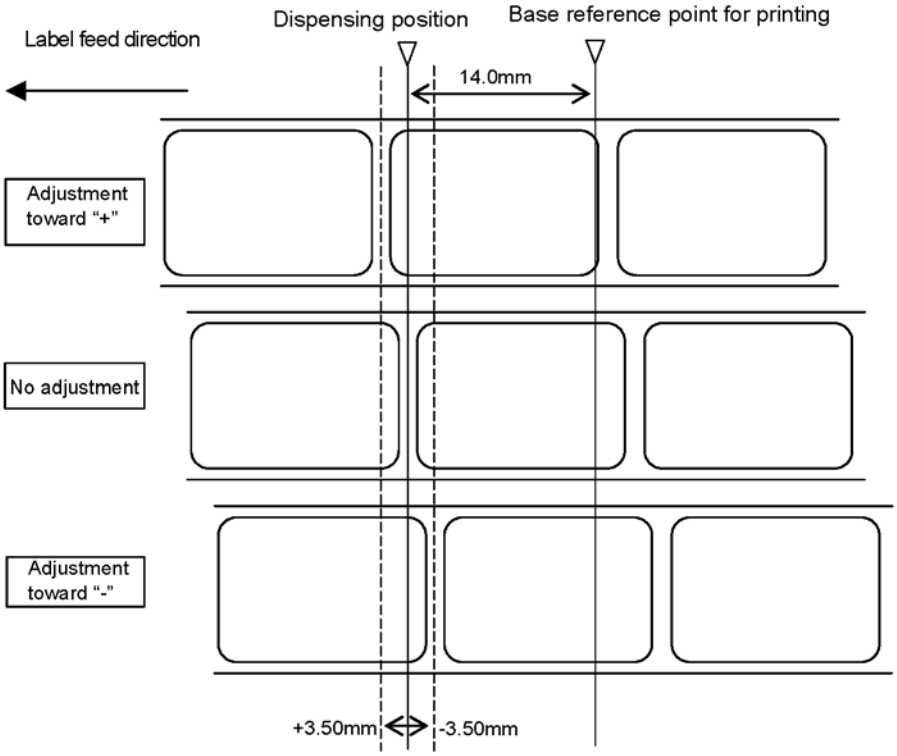


Figure 9-5b, Dispense Position (Gap Sensor)

PRINTER CONNECTION DIAGRAM

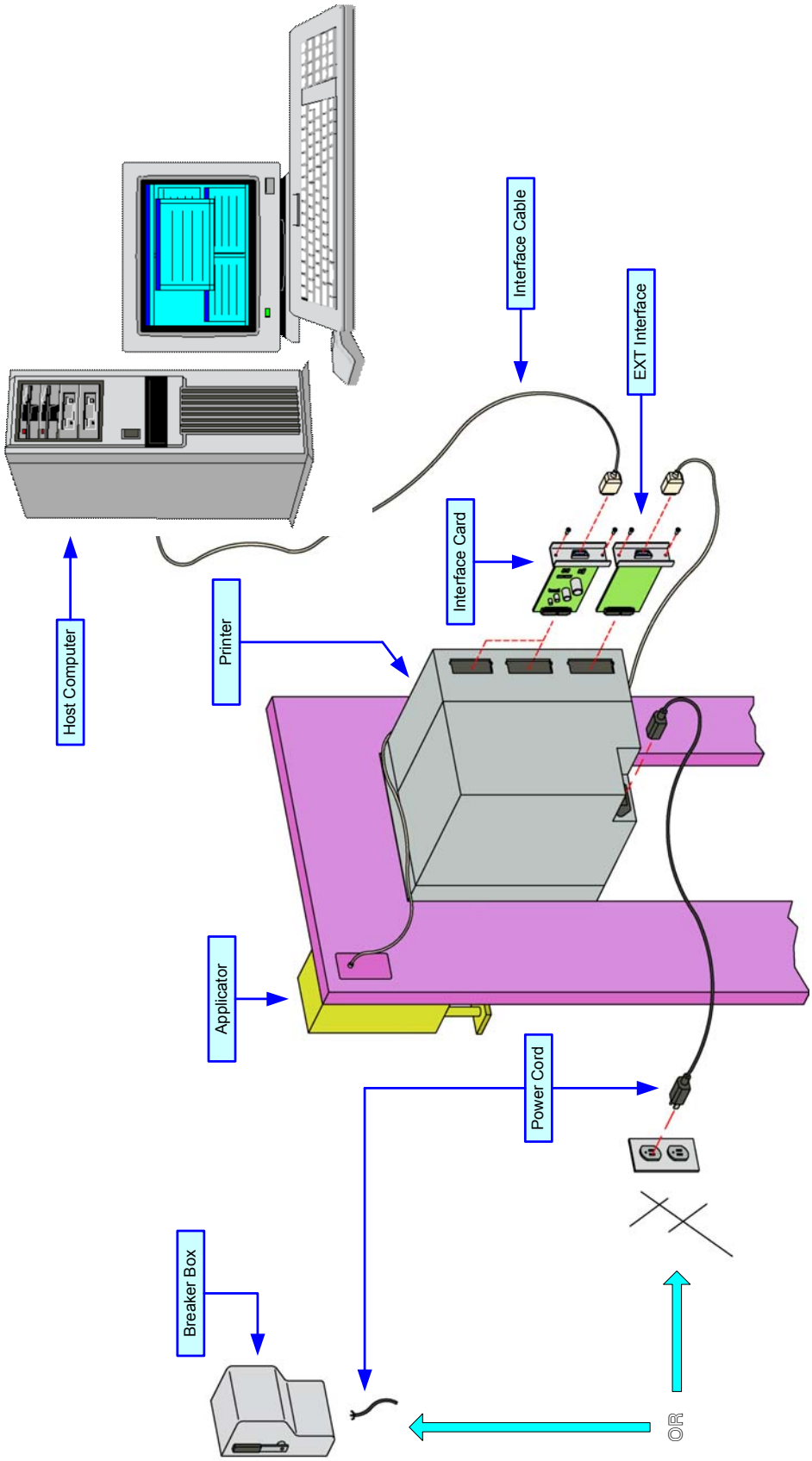


Figure 9-6, Printer Connection Diagram

PRINTER LOADING DIAGRAM

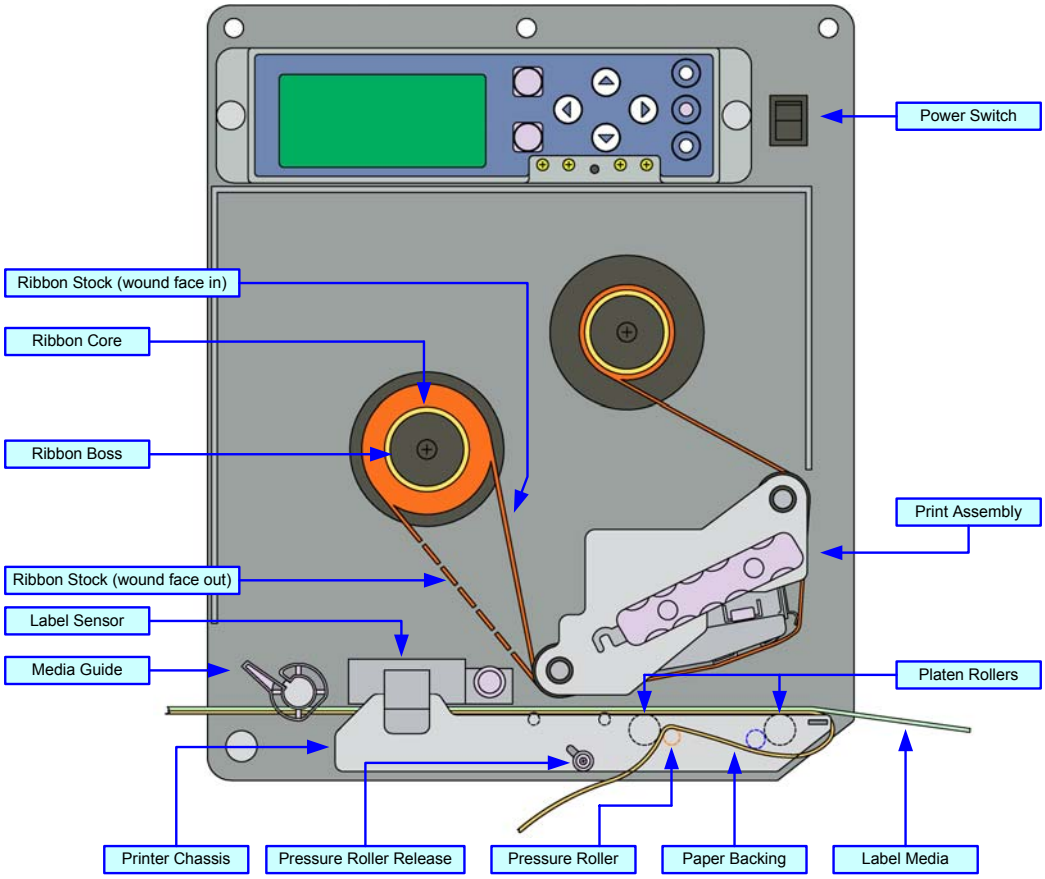


Figure 9-7a, Ribbon & Media Loading Diagram

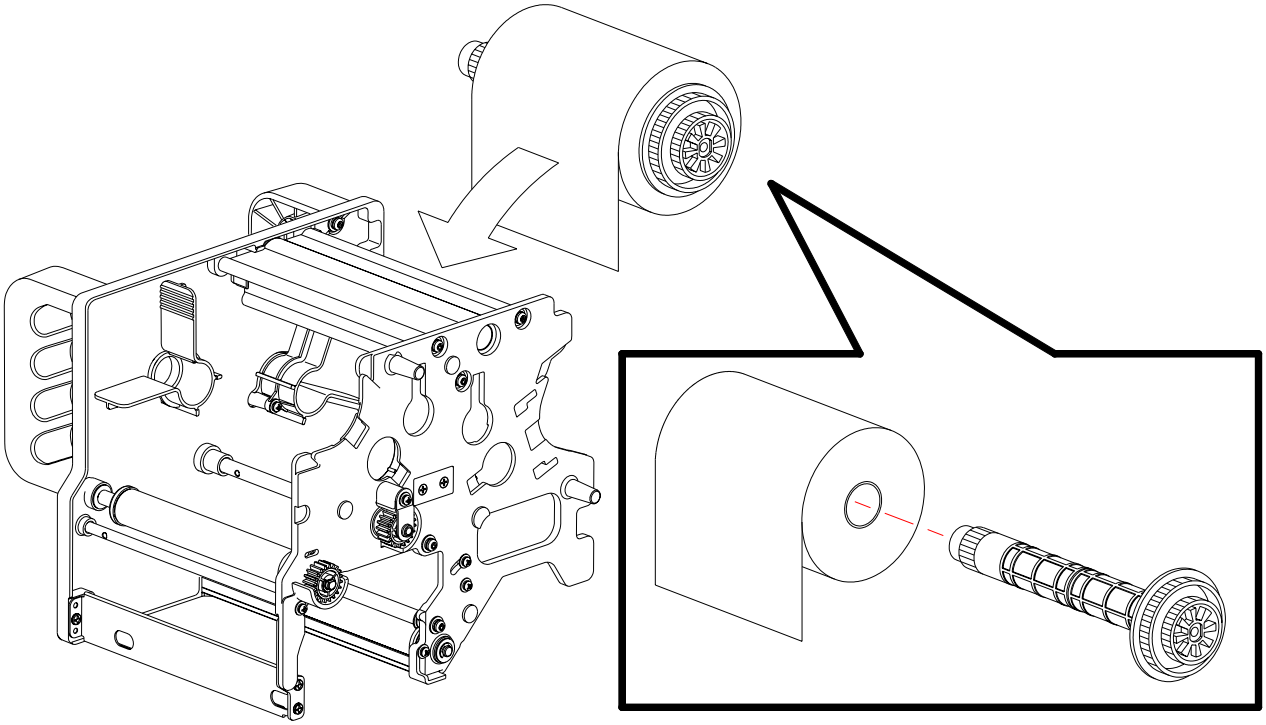


Figure 9-7b, Ribbon Loading Diagram (Cassette Load)

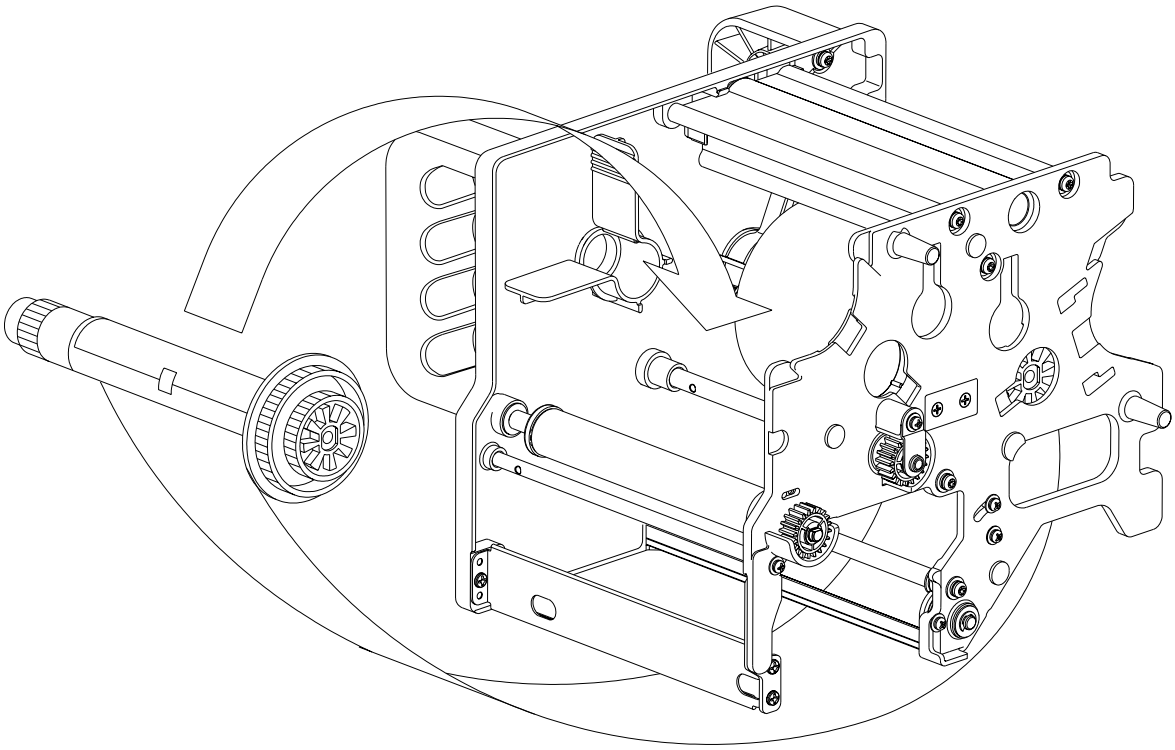


Figure 9-7c, Ribbon Loading Diagram (Cassette Load)

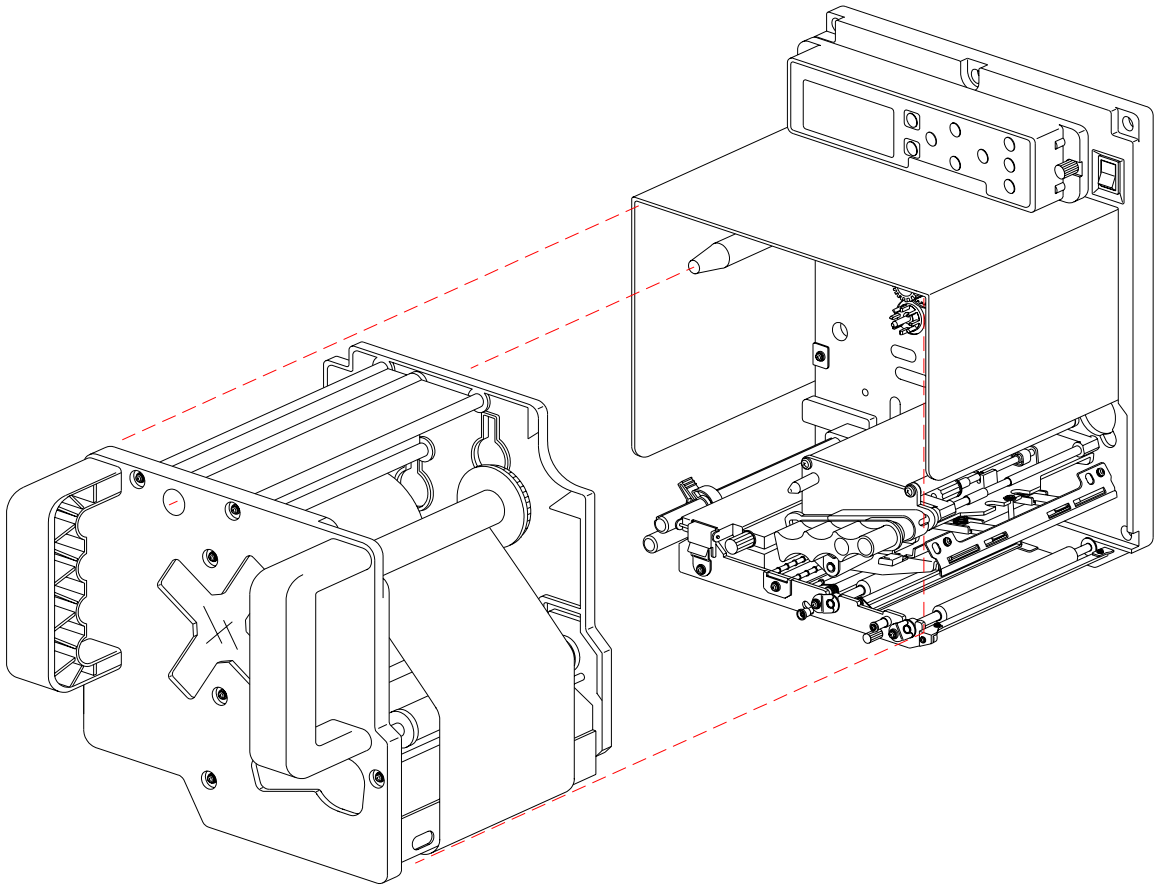


Figure 9-7d, Ribbon Loading Diagram (Cassette Load)

TYPICAL APPLICATOR PROCESS

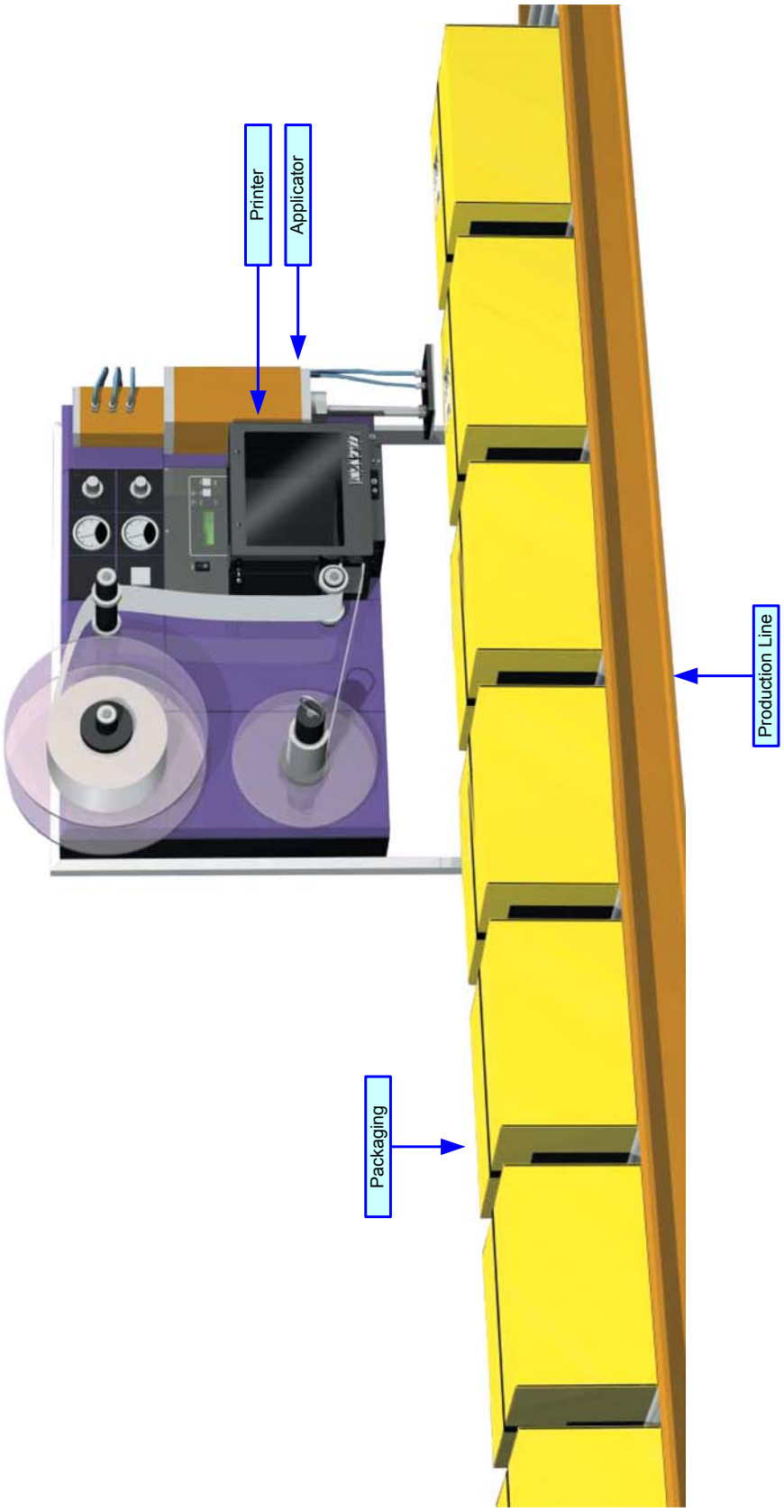


Figure 9-8, Typical Applicator Process

PRINTER PACKING & UNPACKING DIAGRAM

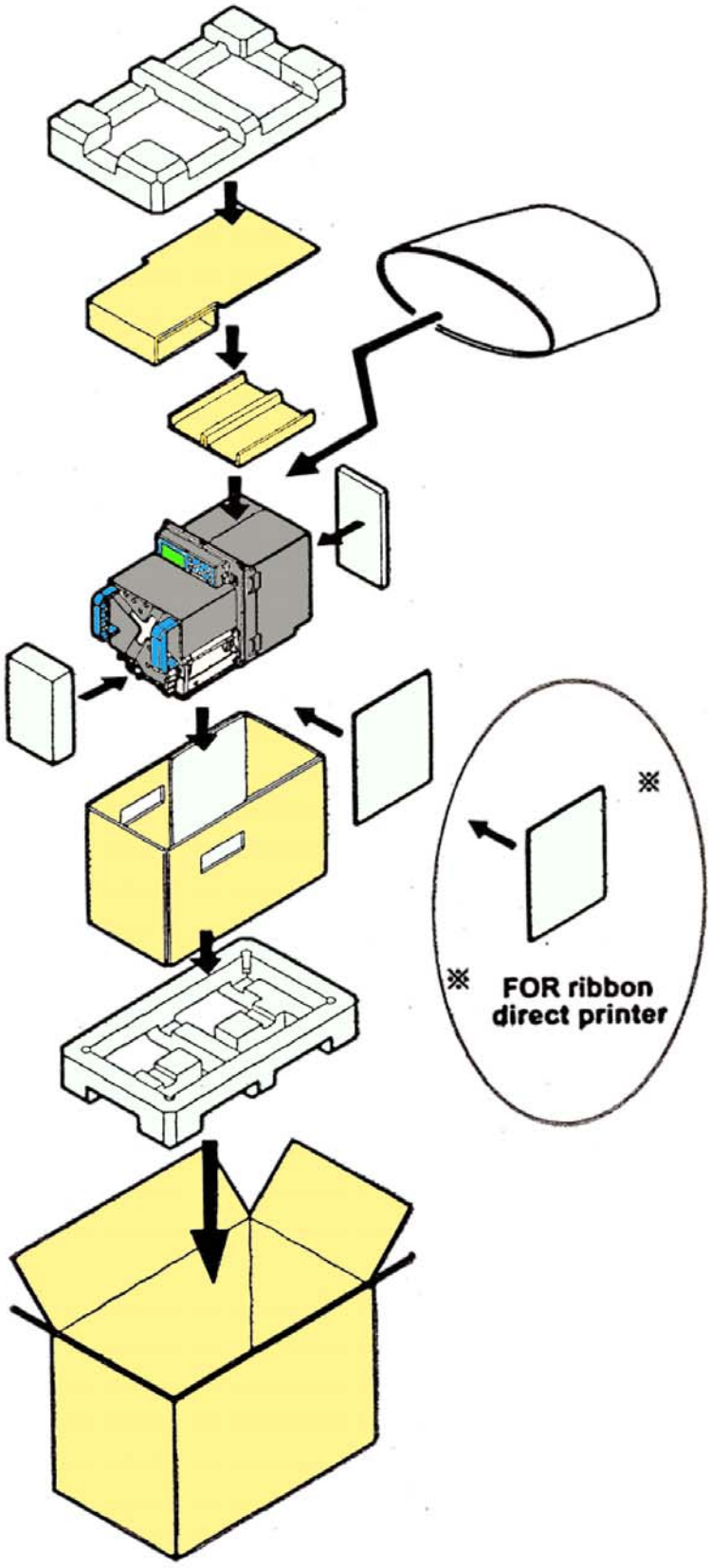


Figure 9-9, Printer Packing & Unpacking

READY/BUSY TIMING CHARTS

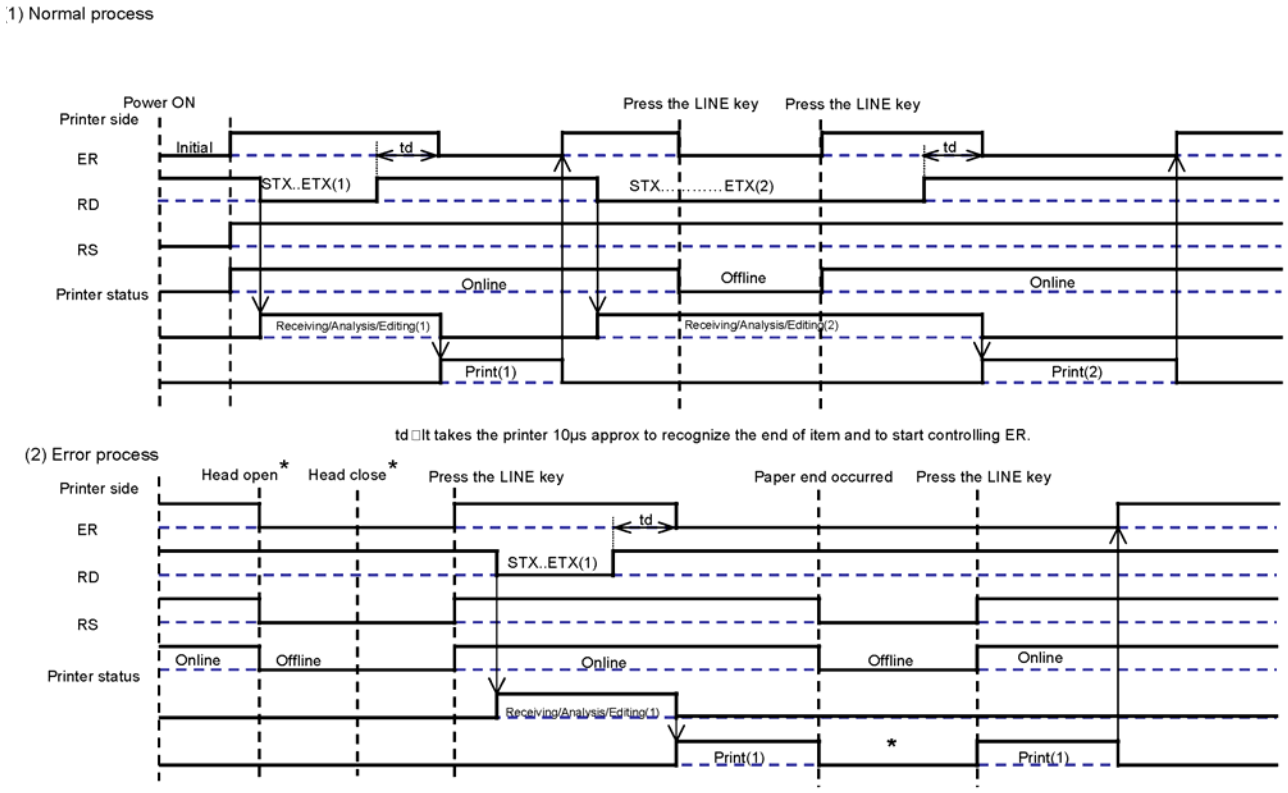


Figure 9-10a, Single-Item Buffer Timing Charts

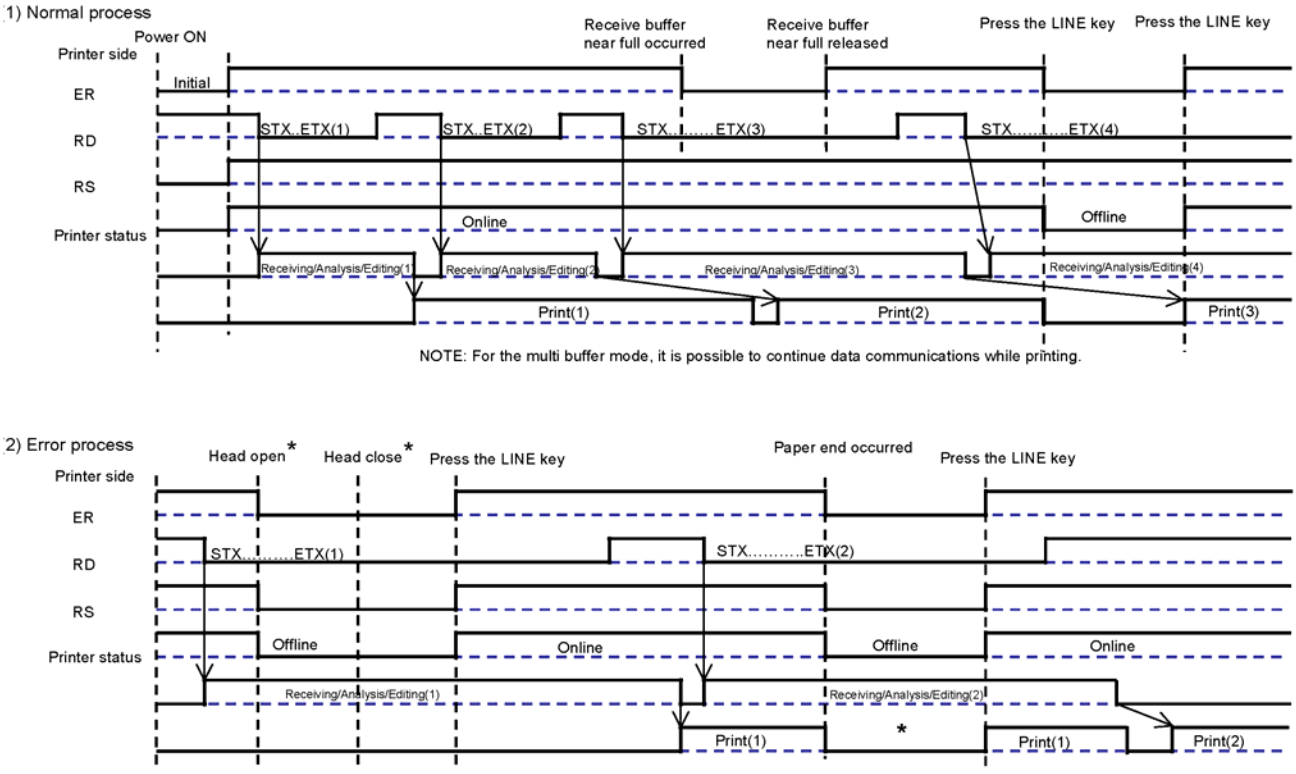
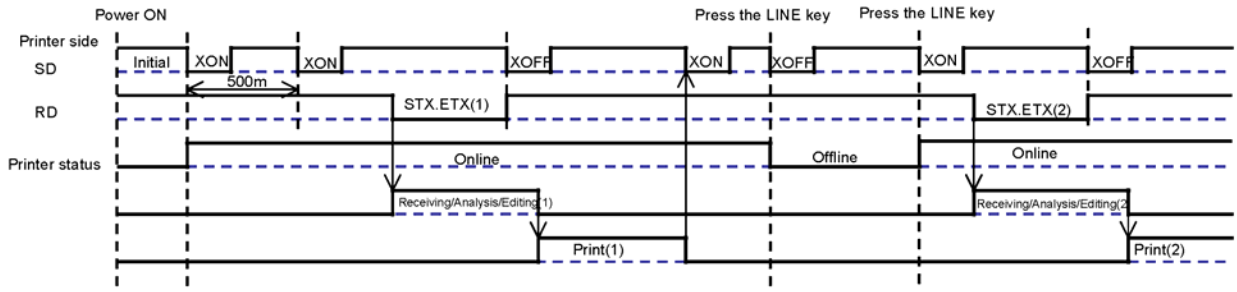


Figure 9-10b, Multiple-Item Buffer Timing Charts

X-ON/X-OFF TIMING CHARTS

(1) Normal process



NOTE: In this protocol, executing the polling of "XON" at intervals of 500ms from the power supply to the first data reception.

(2) Error process

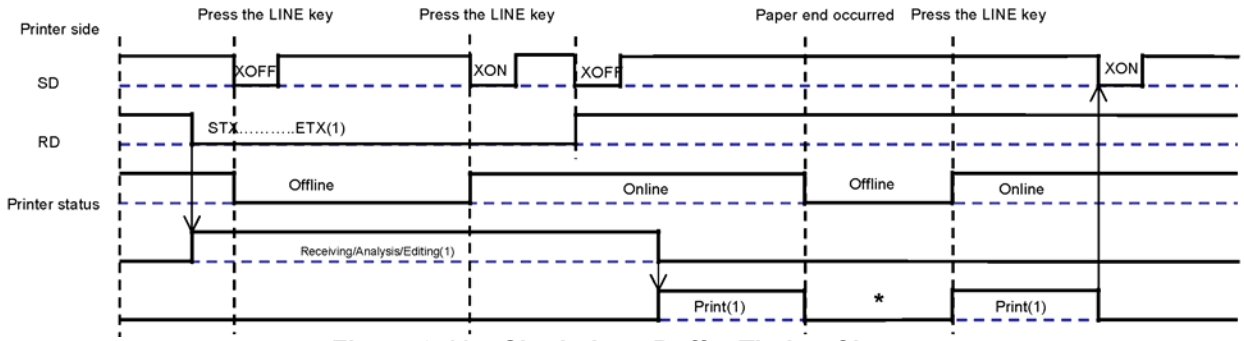
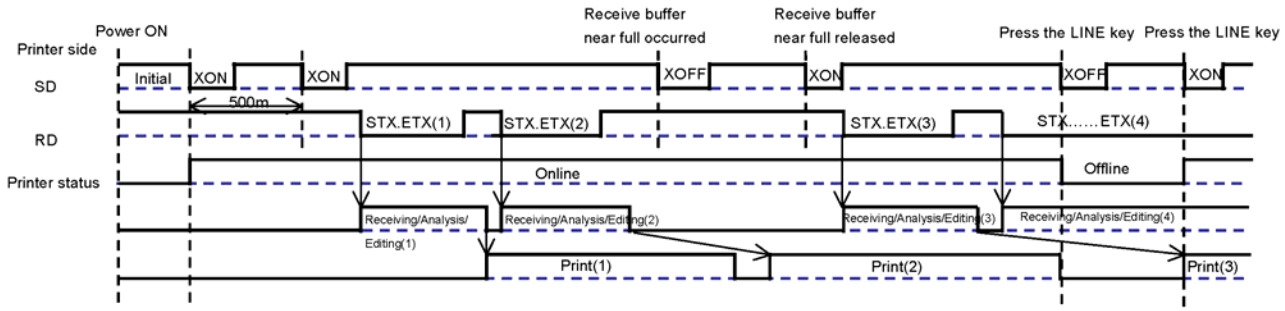


Figure 9-11a, Single-Item Buffer Timing Chart

(1) Normal process



NOTE: In this protocol, executing the polling of "XON" at intervals of 500ms from the power supply to the first data reception.

(2) Error process

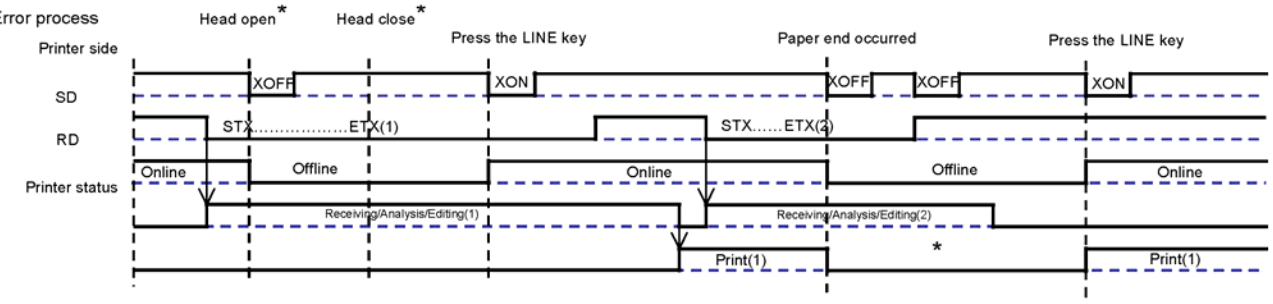


Figure 9-11b, Multiple-Item Buffer Timing Chart

SESSION CONNECT/DISCONNECT DIAGRAM

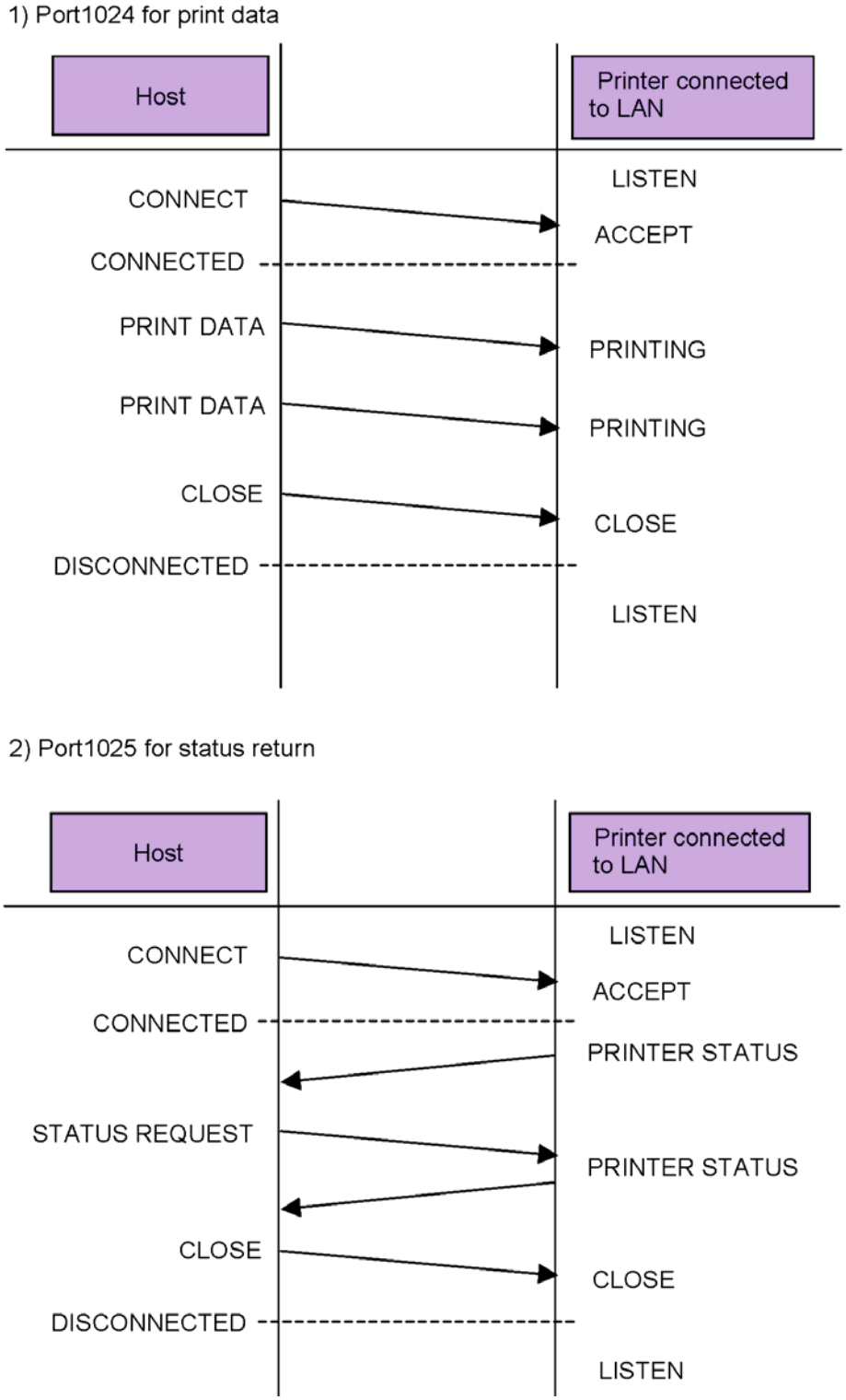


Figure 9-12, Session connect/Disconnect Diagram

PRINTER MOUNTING DIAGRAM

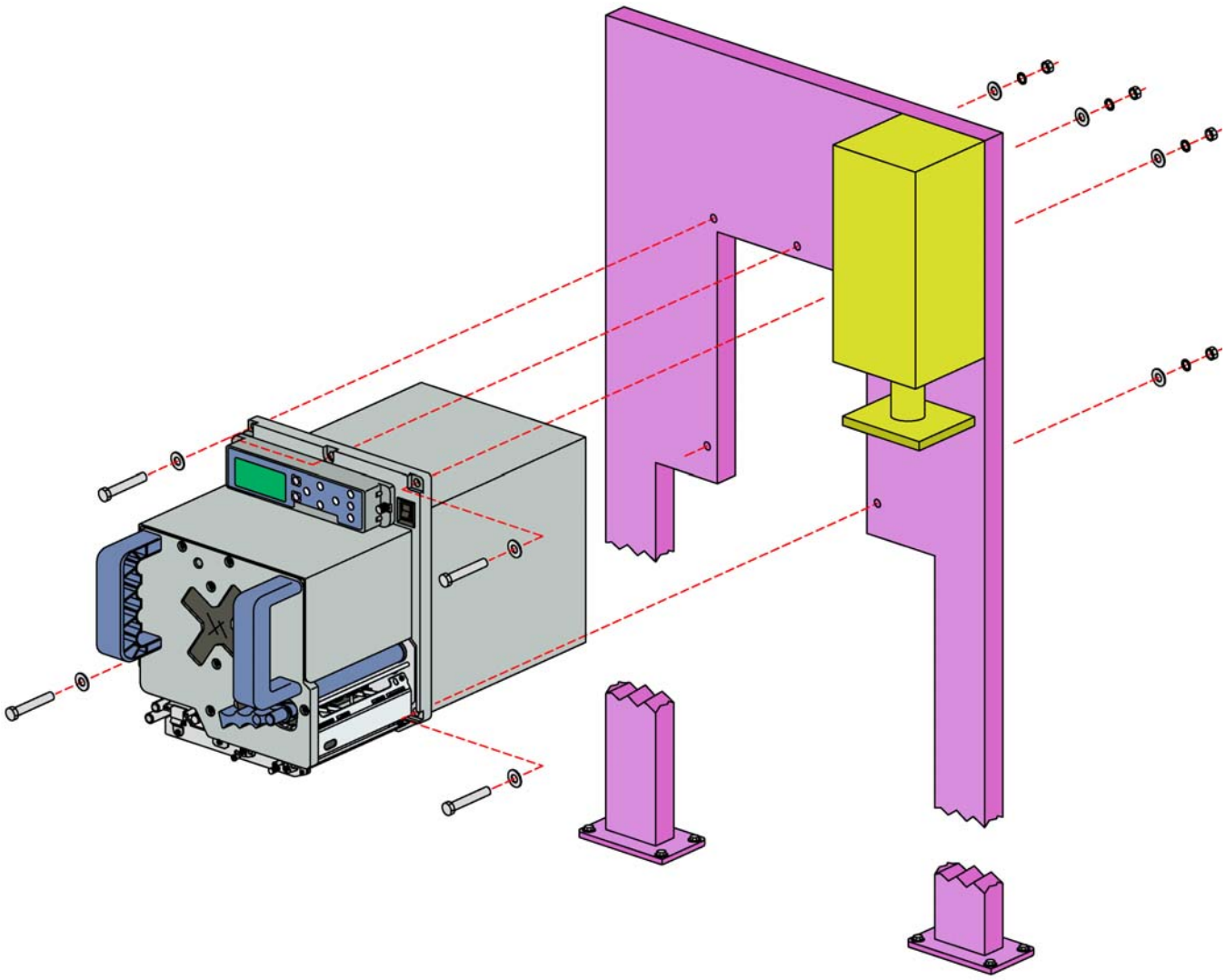


Figure 9-13, Printer Mounting Diagram

PRINTER DIMENSIONS (STANDARD W/CASSETTE)

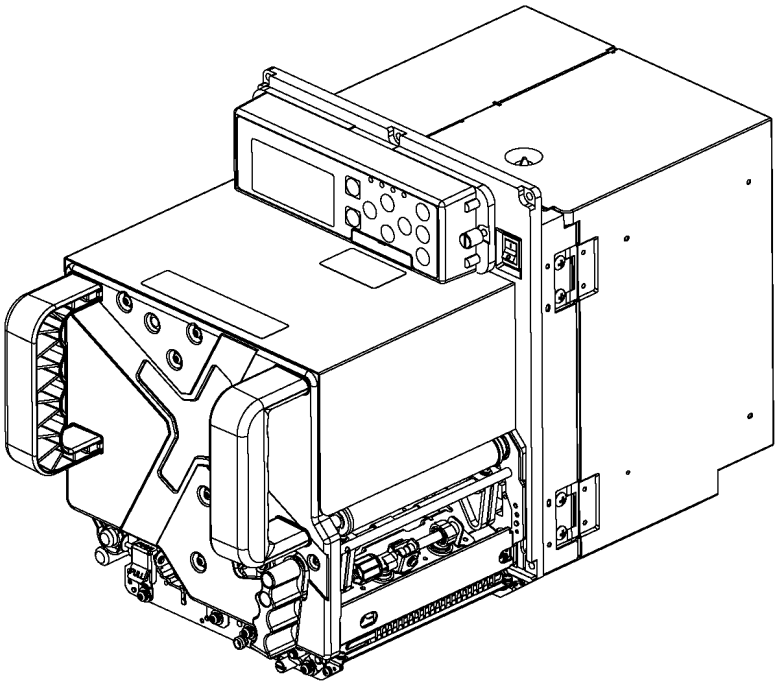


Figure 9-14a, Printer Three/Quarter View

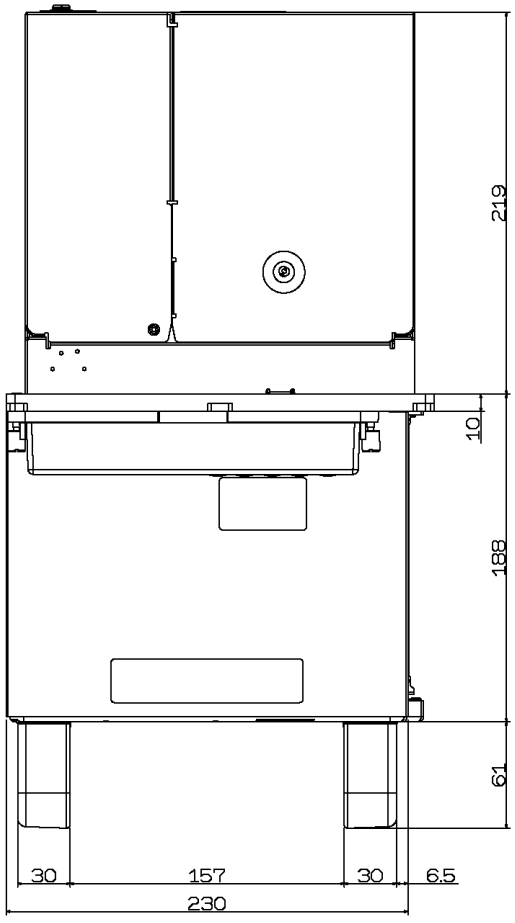


Figure 9-14b, Printer Top View

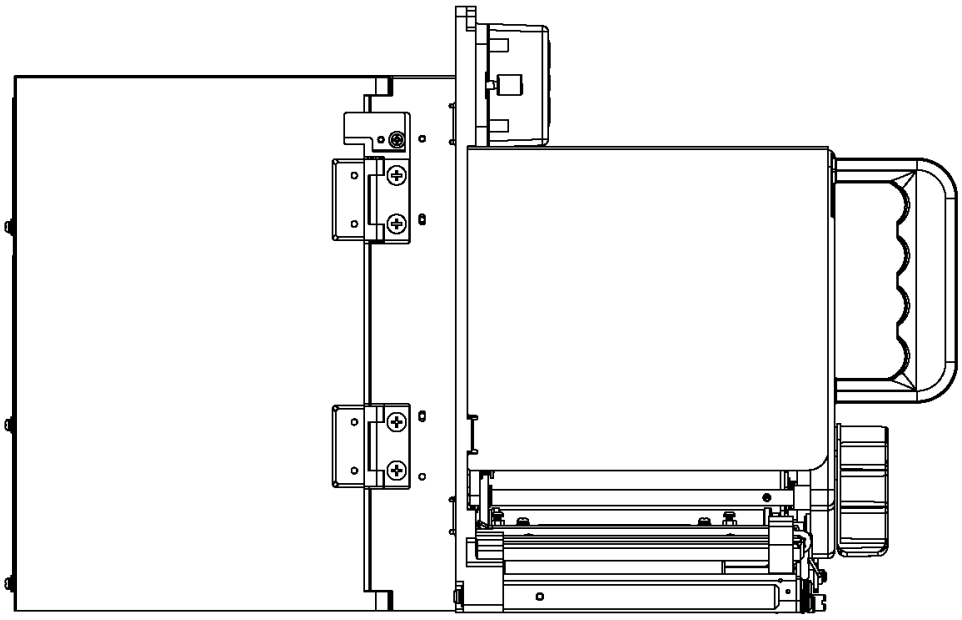


Figure 9-14c, Printer Left-Side View

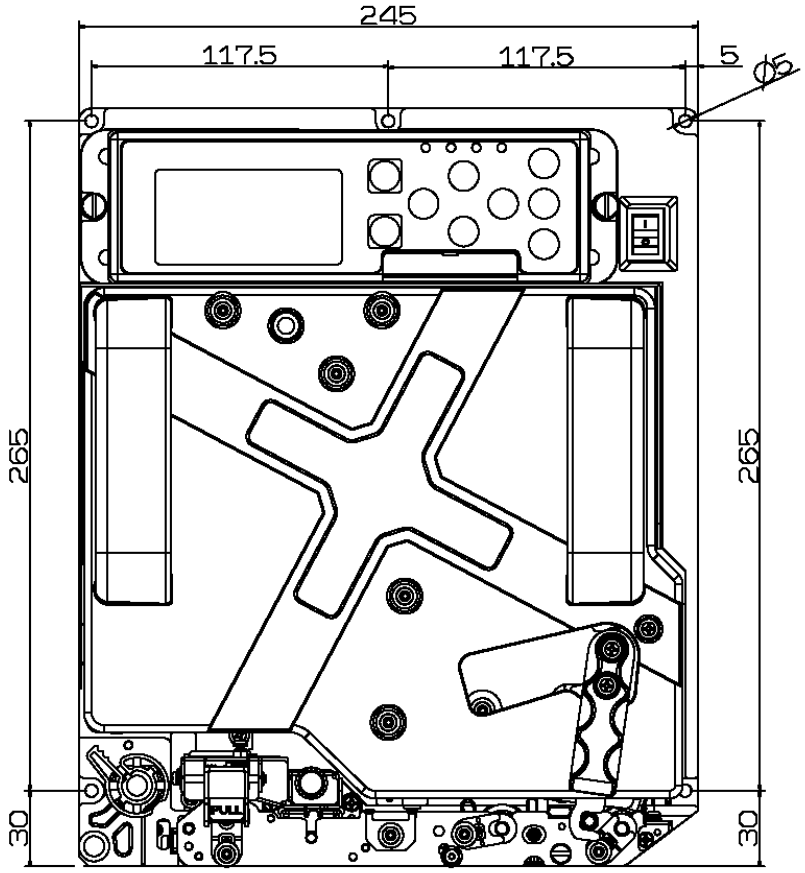


Figure 9-14d, Printer Front View

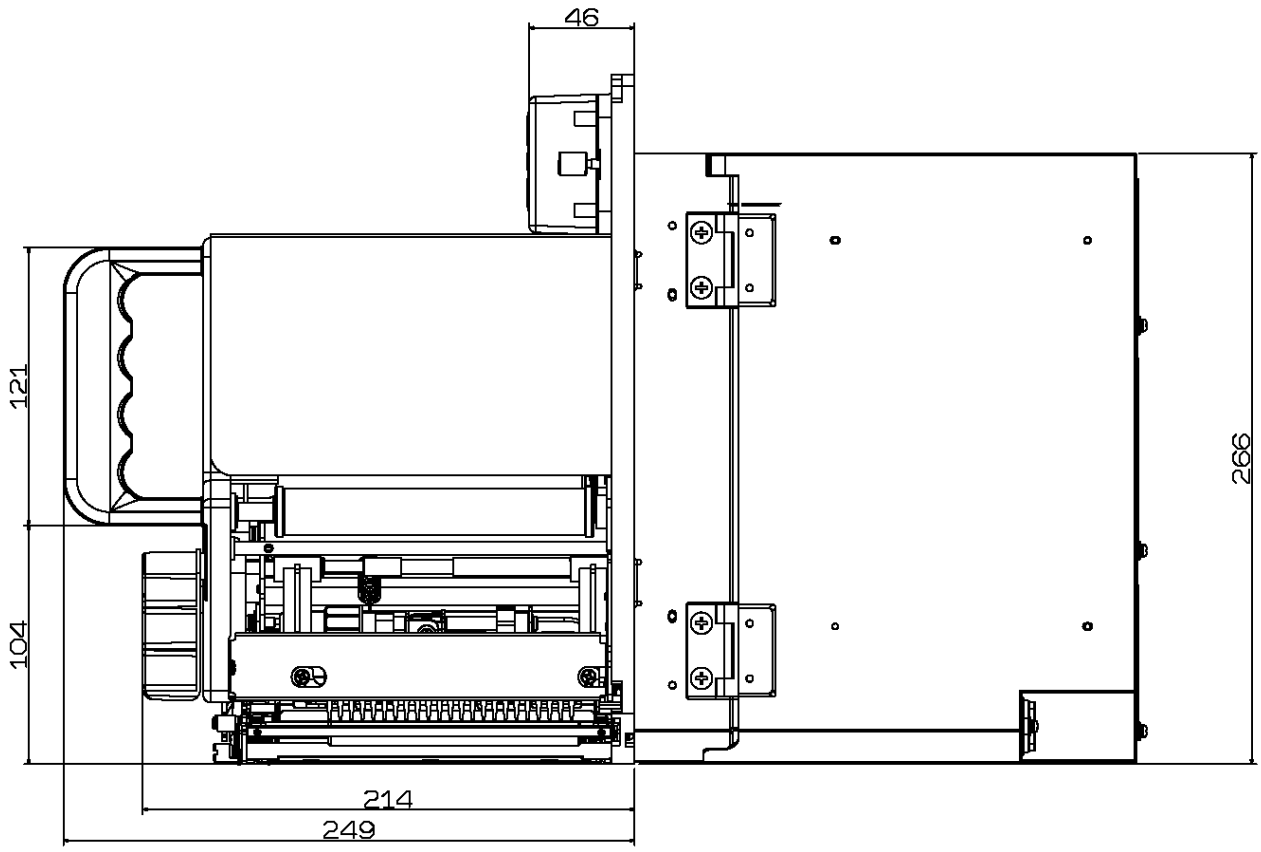


Figure 9-14e, Printer Right-Side View

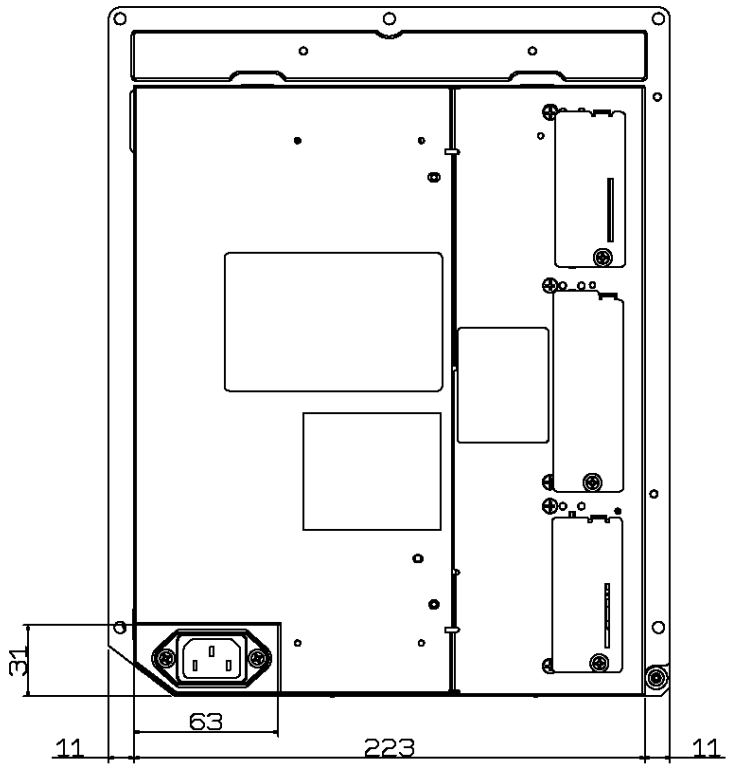


Figure 9-14f, Printer Rear View

PRINTER DIMENSIONS (OPPOSITE W/CASSETTE)

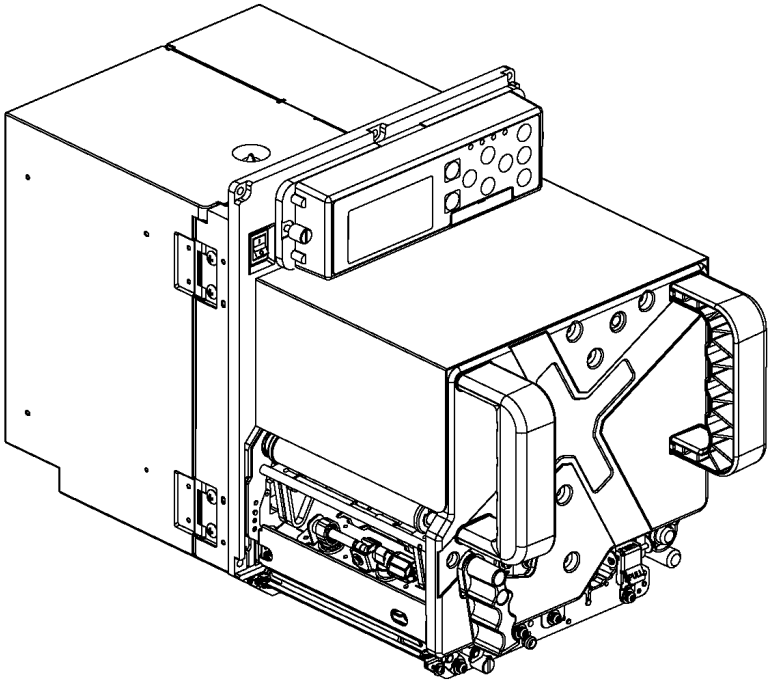


Figure 9-15a, Printer Three/Quarter View

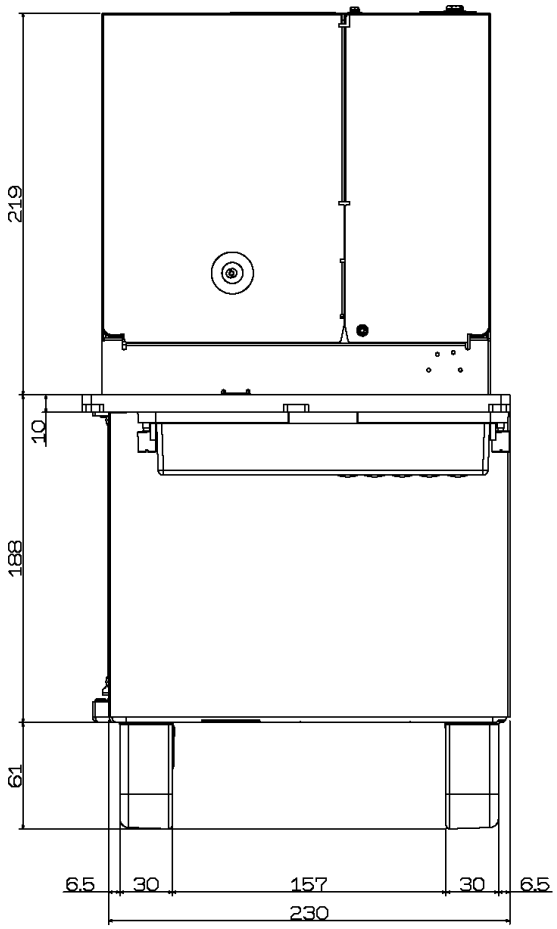


Figure 9-15b, Printer Top View

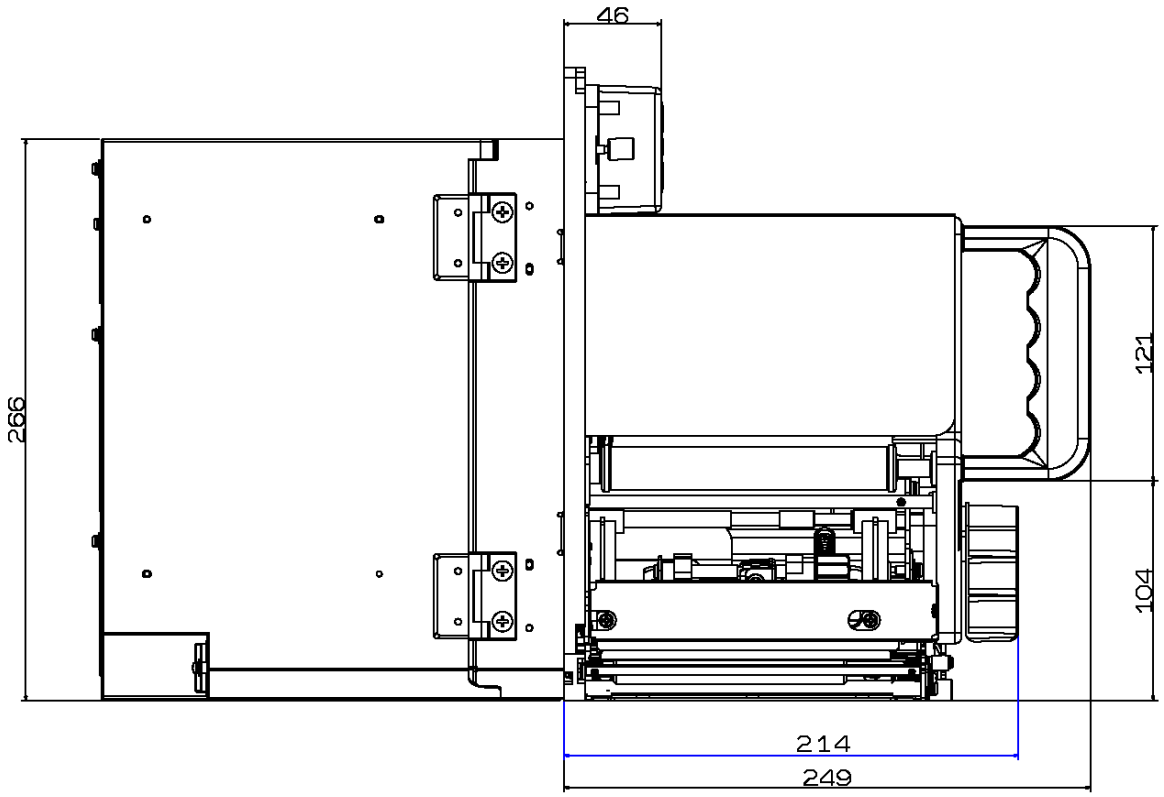


Figure 9-15c, Printer Left-Side View

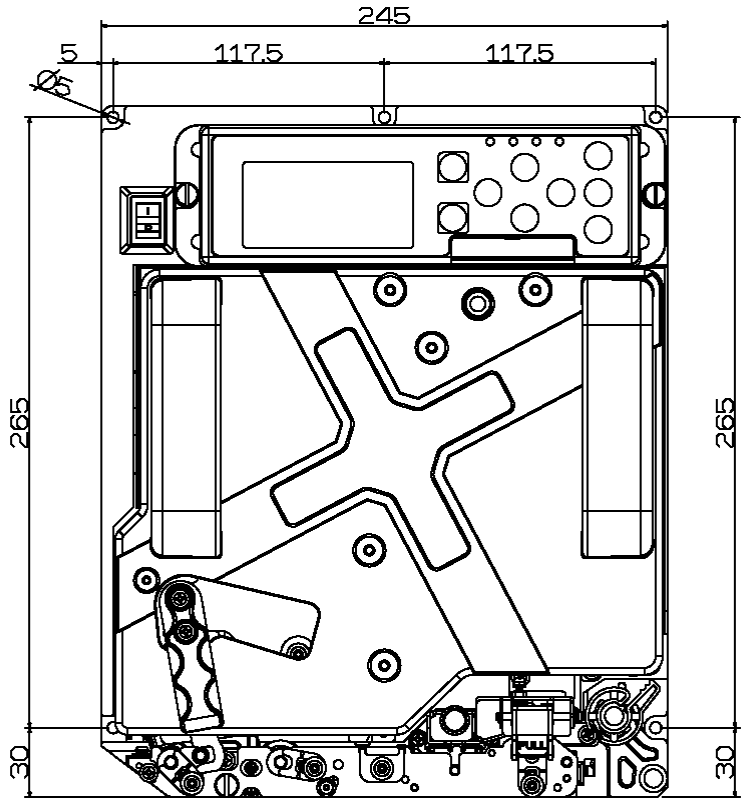


Figure 9-15d, Printer Front View

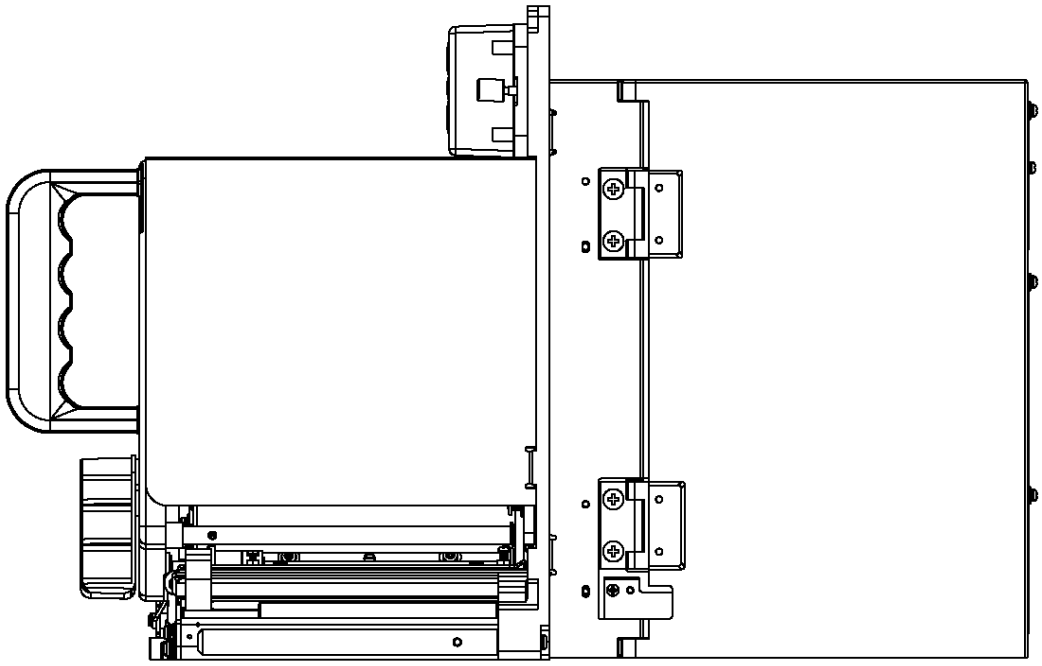


Figure 9-15e, Printer Right-Side View

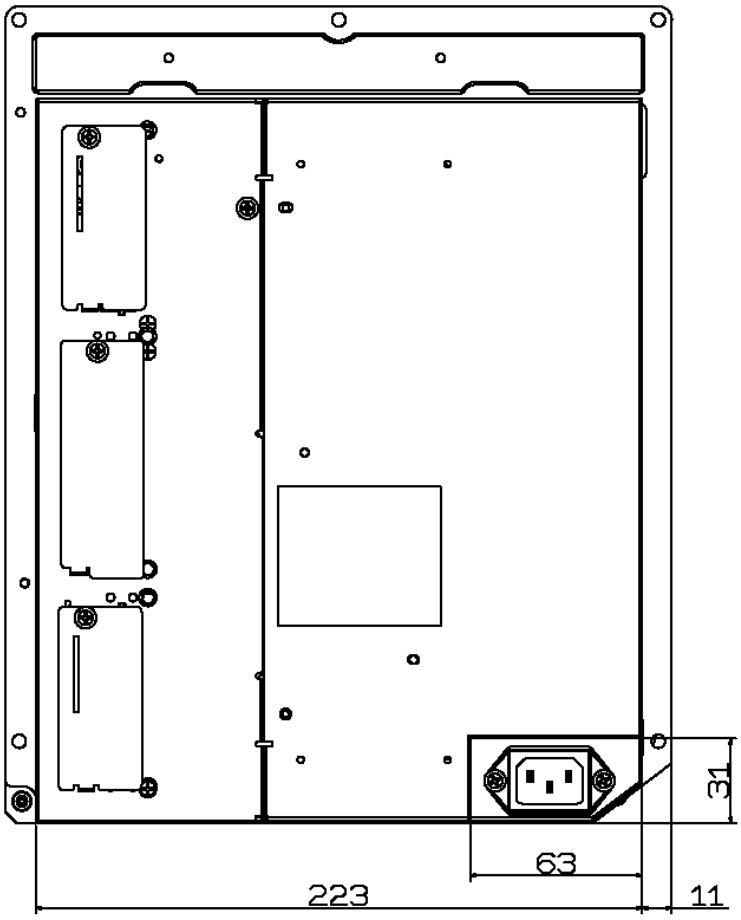


Figure 9-15f, Printer Rear View

PRINTER DIMENSIONS (STANDARD DIRECT LOAD)

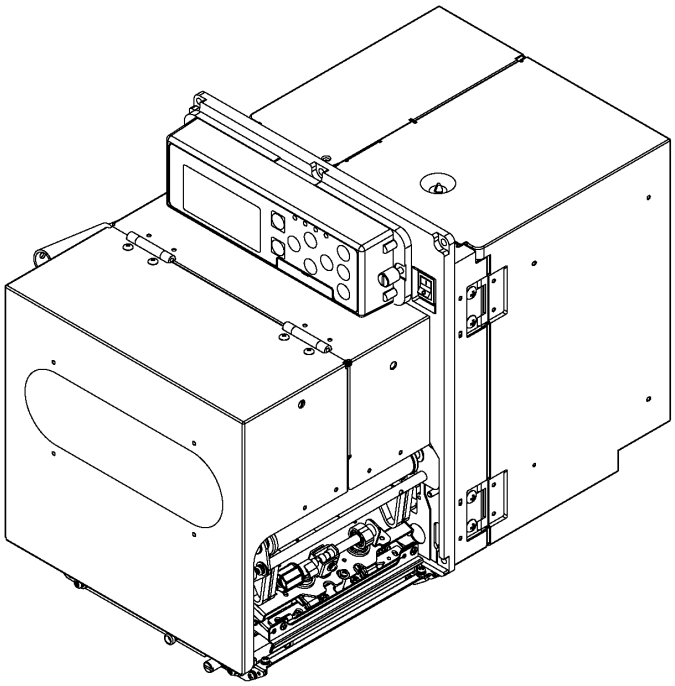


Figure 9-16a, Printer Three/Quarter View

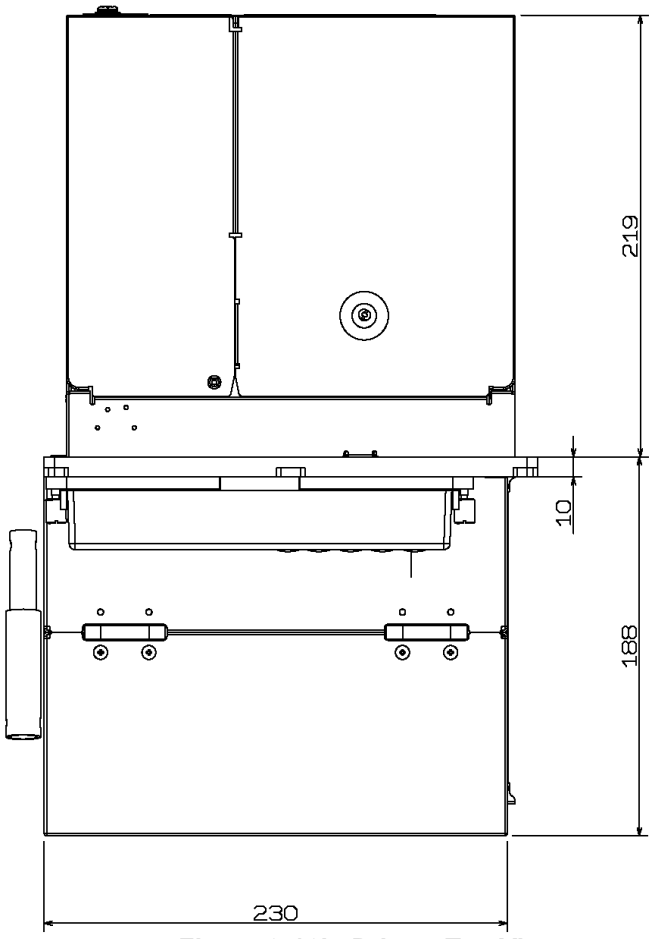


Figure 9-16b, Printer Top View

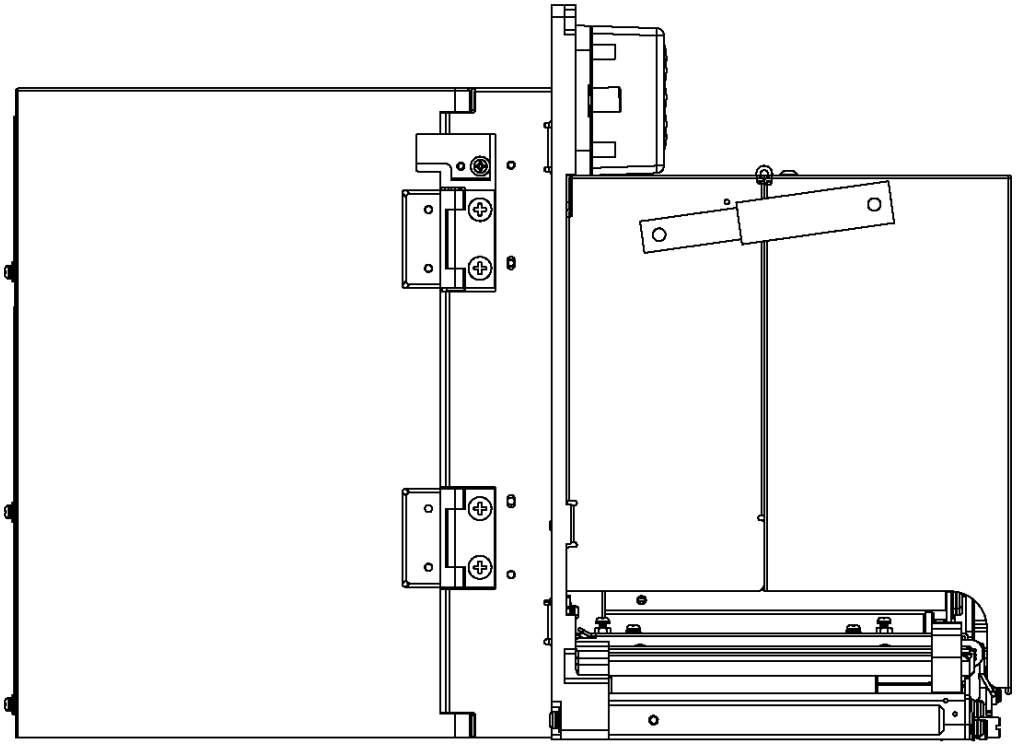


Figure 9-16c, Printer Left-Side View

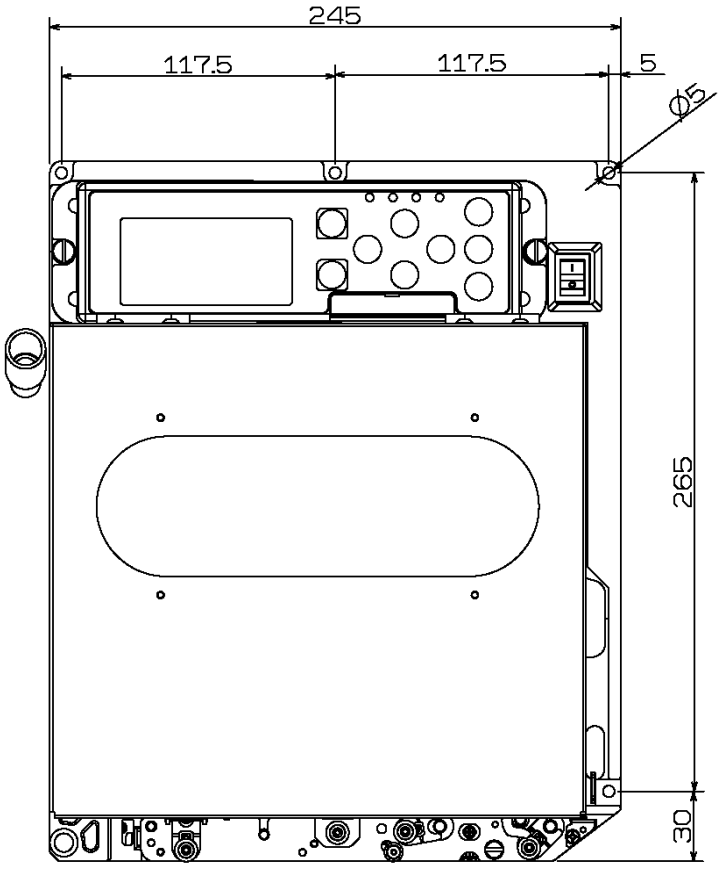


Figure 9-16d, Printer Front View

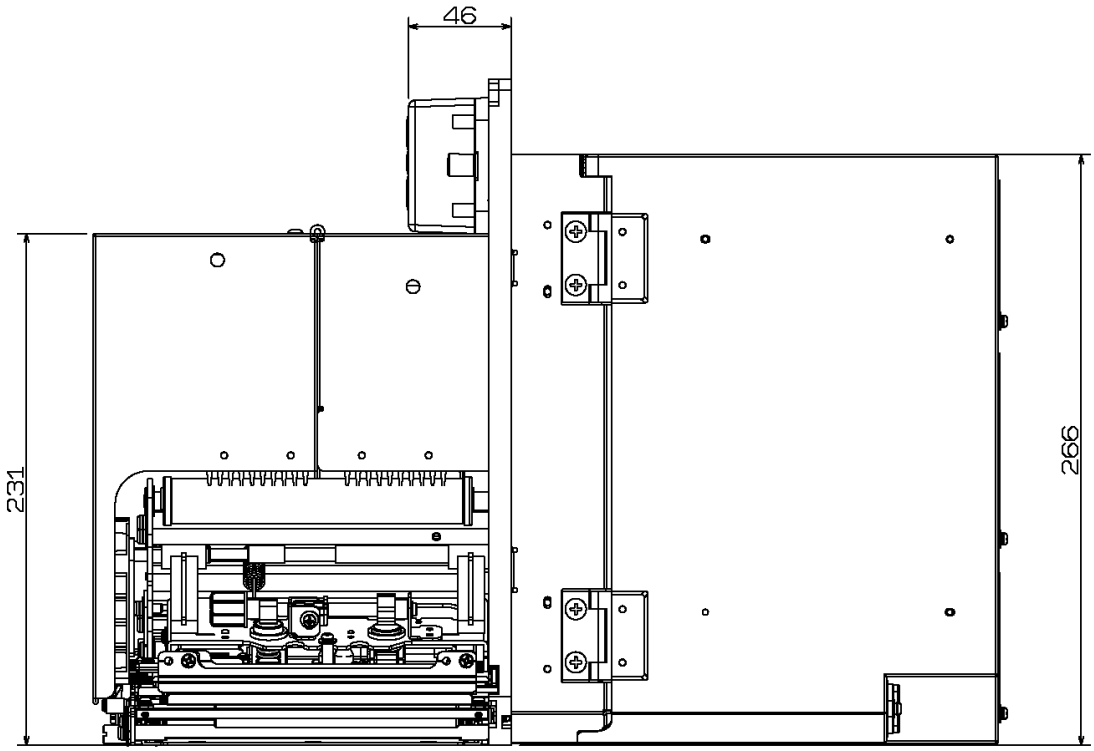


Figure 9-16e, Printer Right-Side View

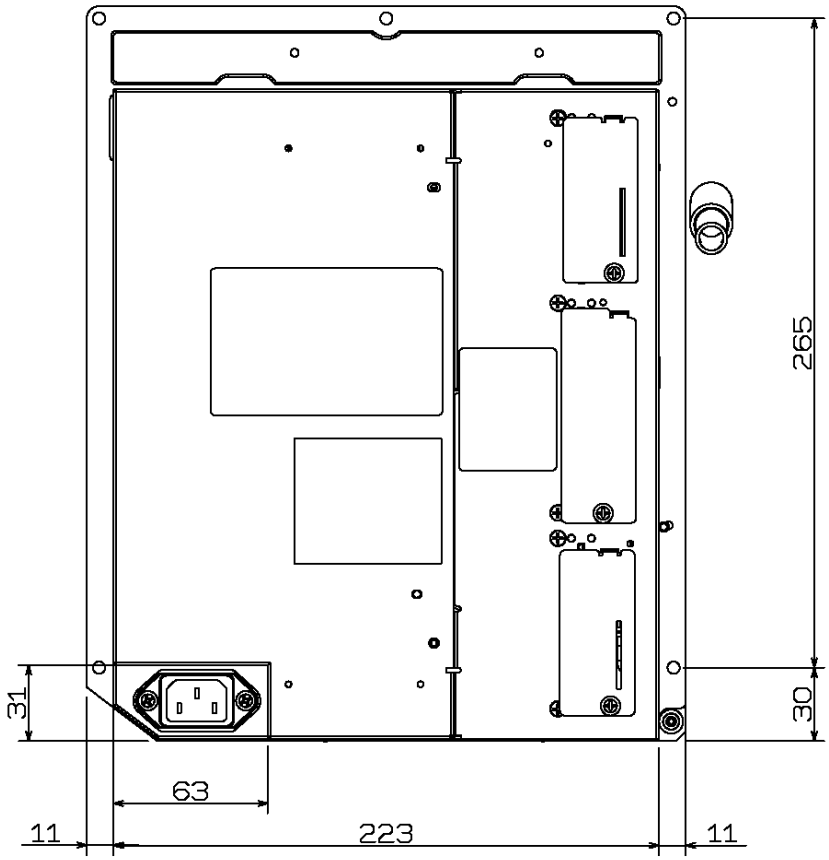


Figure 9-16f, Printer Rear View

PRINTER DIMENSIONS (OPPOSITE DIRECT LOAD)

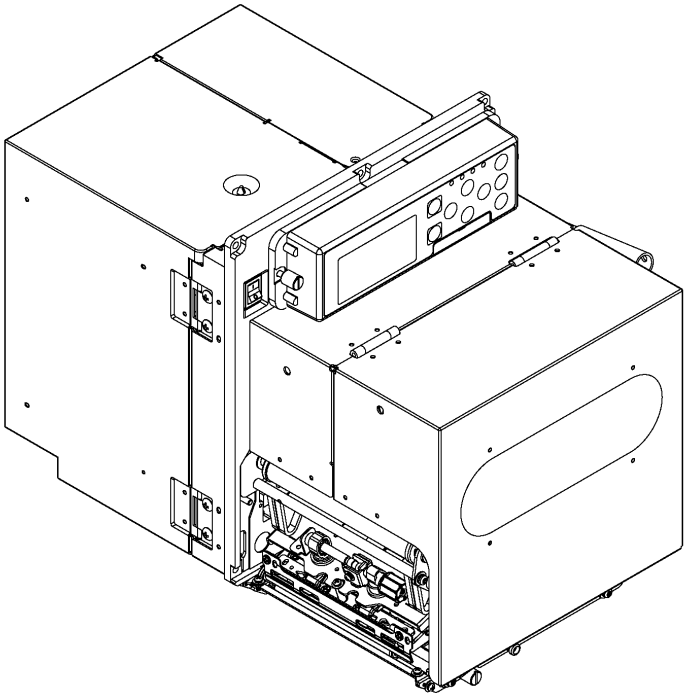


Figure 9-17a, Printer Three/Quarter View

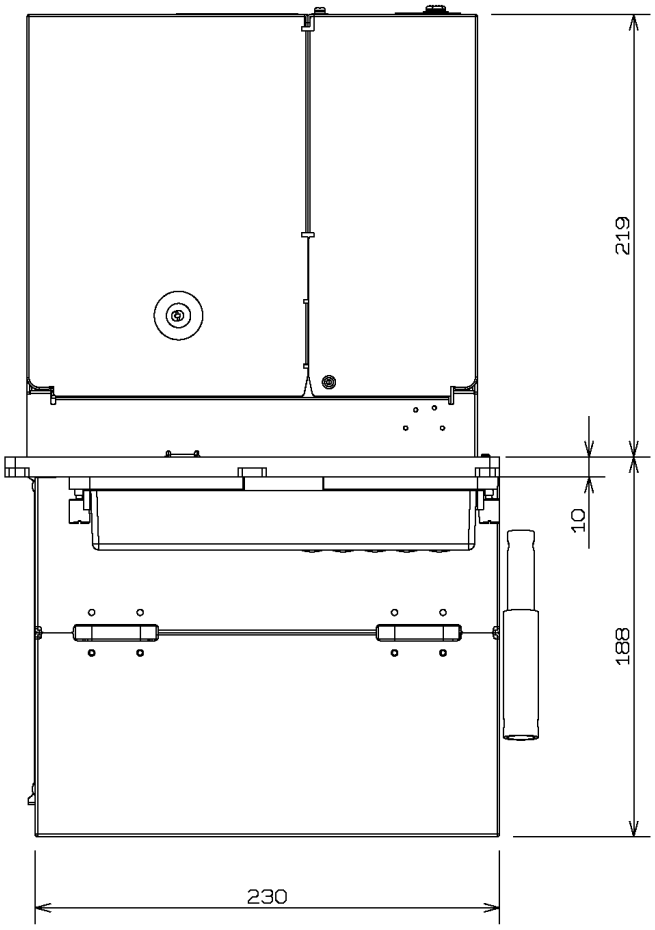


Figure 9-17b, Printer Top View

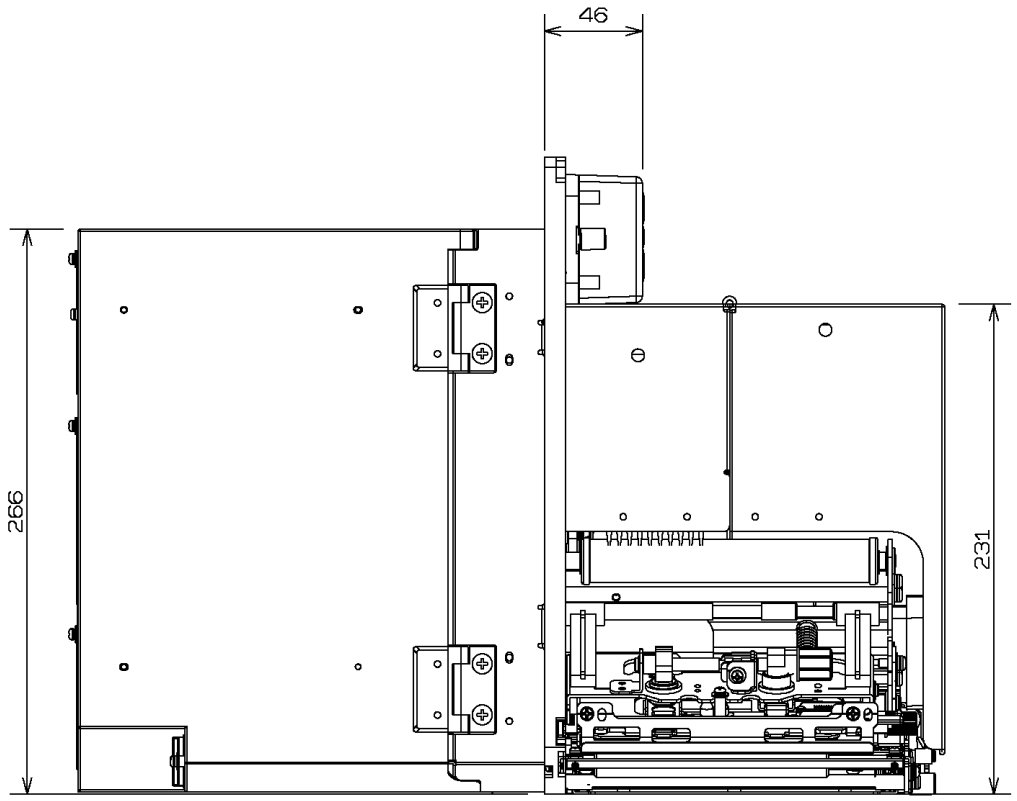


Figure 9-17c, Printer Left-Side View

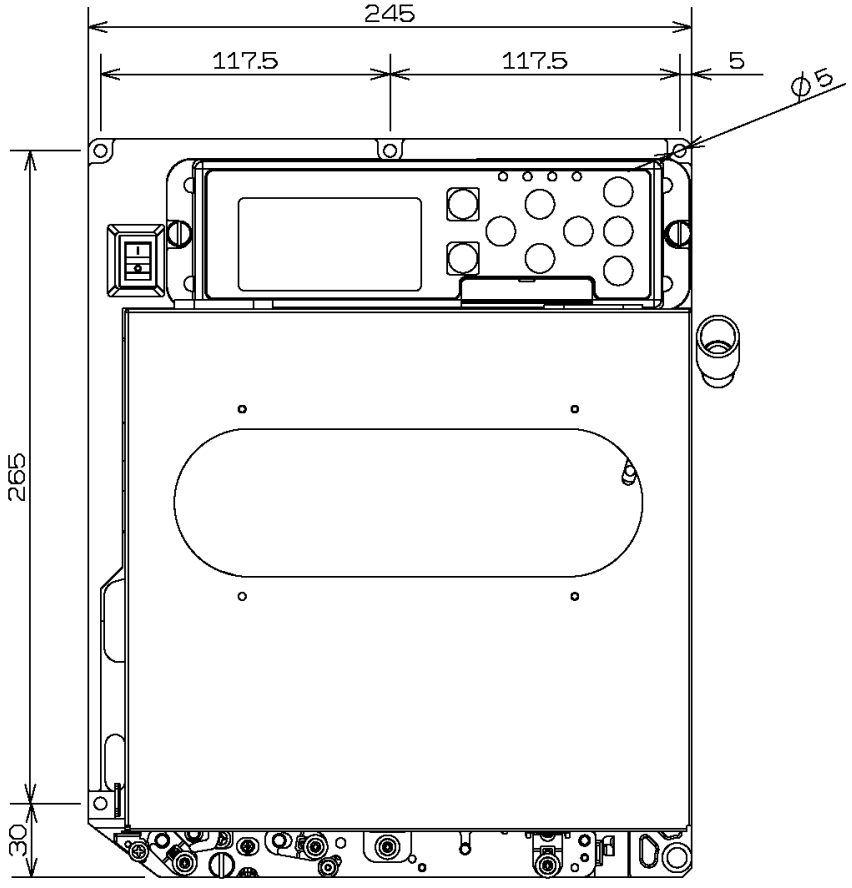


Figure 9-17d, Printer Front View

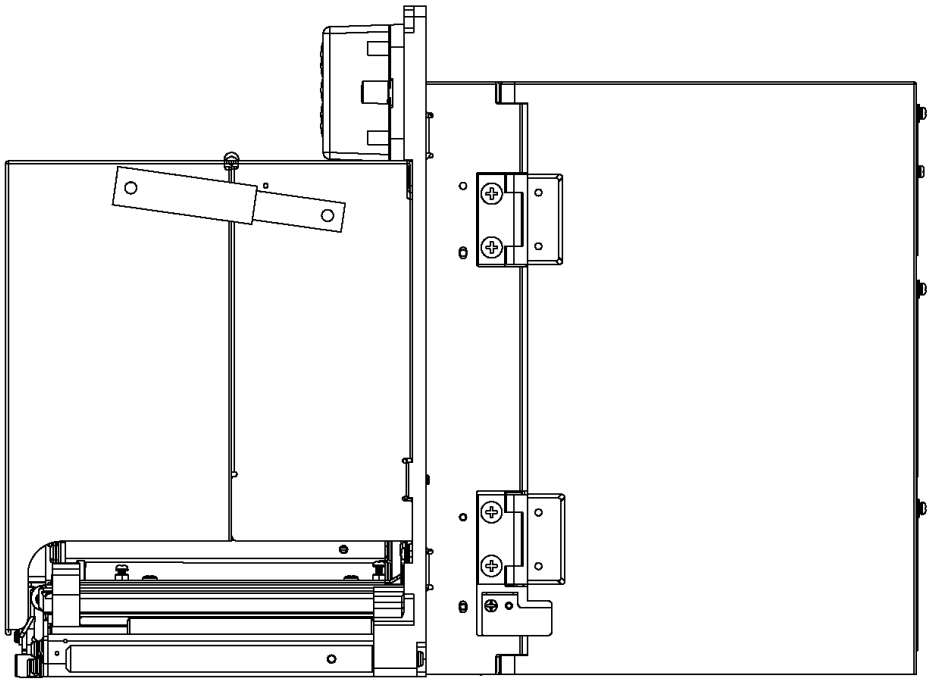


Figure 9-17e, Printer Right-Side View

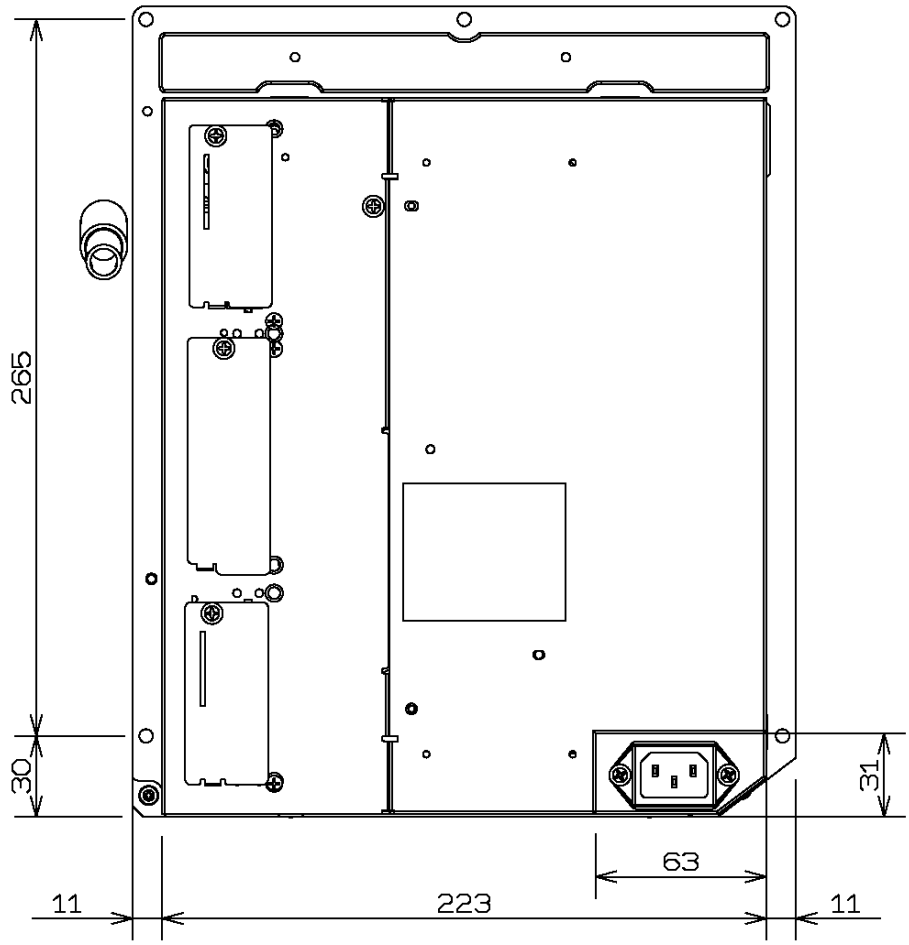


Figure 9-17f, Printer Rear View

GLOSSARY

GLOSSARY	
AC	(Alternating Current) Electrical current that reverses its direction regularly and continually.
Accessory	An optional assembly that may be used to provide an additional function.
Active Tags	RFID tags which use batteries as partial or complete source of power which are further differentiated by separating them into those with replaceable batteries and those which have the batteries inside a sealed unit. Also referred to as Utilized Active Tags.
Addressability	The ability to address bits, fields, files, or other portions of the storage in an RFID tag.
Advance	To bring forward - the opposite of retract.
Allen Screw	A screw whose head has a hexagonal recess to be driven by an allen wrench.
Aluminum	A silvery, light-weight, metal that resists corrosion.
Anti-Static	Resists static electricity.
Arc	A bow-like curved line or object. The band of sparks between to closely placed electrodes when current leaps the gap from one to the other.
ASCII	(American Standard Code for Information Interchange) The most common format for text files in computers and on the internet. In a ASCII file, each alphabetic, numeric, or special character is represented with a 7-bit binary number (a string of seven 0s or 1s). 128 possible characters are defined.
Assembly	The fitting together of parts, components, or sub-assemblies to form a complete unit.
Asynchronous	A type of two-way communication that occurs with a time delay, allowing participants to respond at their own convenience. This communication allows characters to be sent at irregular intervals by preceding each character with a start bit and following it with a stop bit. The timing of the transmission is not determined by the timing of the previous character.
Audible	A sound loud enough to be heard.
Batch	A grouping of anything.
Baud	The number of signaling elements that occur each second; or stated differently, the number of changes to the transmission media per second in a modulated signal. At slow speeds, one bit of information (signaling element) is encoded in each electrical change. The baud therefore, indicates the number of bits per second (bps) that are transmitted. Assuming asynchronous communication, which requires 10 bits per character, this translates to 30 characters per second (cps). For slow rates, (below 1200 baud), the baud can be divided by 10 to see how many characters per second are sent. At higher speeds, it is possible to encode more than 1 bit in each electrical change. Thusly, 4800 baud may allow 9600 bits to be sent each second. At high data transfer speeds, data transmission rates are usually expressed in bits per second (bps) rather than baud.
Bi-Directional	Capable of operating in two directions along the same plane or medium. In the case a communication cable or an RFID tag, one that transmits as well as receives, read and written.
Binary	A numeral system that represents numeric values using two symbols, typically 0 and 1. A binary number can be represented by any sequence of bits (binary digits), which in turn may be represented by any mechanism capable of being in two mutually exclusive states.
Bits	Refers to a single digit in the binary numeral system. A bit can either be *on* or *off* - a 1 or 0. A byte is a collection of eight bits.
Block Diagram	Shows the interconnections between system components by using a pictorial representation of a system and sub-systems linked to illustrate their relationships.
Bolt	A threaded metal rod with a flanged head that is used with a nut to hold parts together.
Bore	A hole in, or through something.

GLOSSARY	
Bytes	A collection of 8 bits used in the binary system.
Capacity	As it relates to RFID, the number of bits or bytes that can be programmed into a tag. This may represent the bits accessible to the user or the total number - including those reserved to the manufacturer (e.g., parity or control bits).
Capture Window/Field	Region of the scanner field in which an RFID tag will operate.
Cavity	A recessed area in something. In the case of a die set, the core is one of two part with the core being its mating half.
Chamfer	To slice off the corners of an angle to create a beveled edge.
Character	Any single numeral, letter, or symbol.
Chassis Assembly	A group of components or sub-assemblies that comprise the base of an assembly.
Circumference	The periphery of a circle or other rounded object - also the measurement of this distance.
Circuit	A network of wires, resistors, and other electronic devices over which electrical impulses travel.
Clockwise	To rotate from left to right.
Closed Systems	As it relates to RFID, a system in which relevant data regarding the attributes of the object is stored in a common database accessible via data link by referencing the individual ID code.
Collar	A sleeve applied to a rod, shaft, or pipe to prevent sideward motion.
Component	A single part that may applied to others to form an assembly.
Composite	An object that is comprised of, or layered with, two or more materials to achieve a desired outcome.
Concave	A curved recess or hollow - the opposite of convex.
Concentric	Multiple items that share a common center - example: a circle centered within a circle.
Configuration	The arrangement of parts or components to operate in unison for a specific activity.
	To program software to enable, disable, or specify how various features will function.
Connector	Devices for joining electrical and electronic circuits through coupling. Typically, one mating half is a plug (male) and the other is a socket (female).
Convex	A spherical shaped surface - one that is curved outward.
Core	The protruding portion of a die set. The core is one of two parts and the cavity being its mating half. The core is convexed and the cavity is concaved.
CPU	(Central Processing Unit) A programmable device that performs all the instruction, logic, and mathematical processing in a computer - is the brains of the computer. The CPU is a microchip that is installed on a motherboard (primary board) that coordinates hardware components. Also referred to as “processor”.
Counter-Clockwise	To rotate from right to left.
Couple	Two mating halves that are connected - example: a plug or receptacle.
Cubic	The X, Y, and Z axis all being equal in size - a three-dimensional object that is equally proportioned.
Current	The flow or rate of flow of electric force.
Cycle	A single revolution of a potentially reoccurring activity - in the case of printer, one label being printed.
DC	(Direct Current) Electrical current flowing in a single direction.
Density	The quantity within a given or specific area or unit.
Deviation	A change in course or the measurement of that change.
Diameter	A straight line from the outer edge of a circle, through the center, and onward to the opposite edge. Also the measurement of that distance (dimension).
Dimension	Any measurable distance.

GLOSSARY	
Diode	Allows current to flow in one direction but not the other to protect sensitive electronics. A diode functions by compositing two conductive materials with one possessing low resistance to electrical current on one side and high resistance on the other.
Dipswitch Complex	A group of tiny switches directly attached to a circuit board to enable configuration for a particular type of application. These switches are two-position: On/Off.
Direct Thermal	The printing method that uses a chemically coated heat sensitive media. Once the heat from the thermal printhead is applied to the media, the media darkens with the image. Direct thermal printing does not require ribbon and is typically used in applications where the label needs to endure for a year or less.
Disable	To deactivate or make unable to function.
Divergent	To deviate from the norm or to possess opposing positions.
DPI	(Dots Per Inch) The quantity of printed dots within a square inch area - the print density.
DRAM	(Dynamic Random Access Memory) DRAM is the most common kind of RAM and is a network of electrically-charged points in which a computer stores quickly accessible data in the form of 0s and 1s. Each storage or memory cell can be directly accessed if the intersecting row or column is known. Each cell consists of a capacitor and a transistor.
Drive Train	The components and sub-assemblies that comprise the mechanical apparatus of motion or kinetic energy.
Eccentric	Multiple items that do not share the same center - example: a circle whose center axis is not the same as that of another to whom it is connected. The opposite of concentric.
E-Clip	Type E snap ring.
EEPROM	(Electrically Erasable Programmable Read-Only Memory) Are ROM chips that do not have to be removed to be rewritten. Nor does the entire chip have to be completely erased to change a specific portion. Changing the contents does not require additional dedicated equipment. The localized application of an electric field to each cell erases the targeted cells which can be rewritten. Since only 1 byte can be changed at a time, EEPROM's are versatile but slow.
Electronic Label	A label that has an electronic RFID tag embedded within.
Electromagnetic Coupling	In RFID, a system that uses a magnetic field as means of transferring data or power.
Electrostatic Coupling	In RFID, a system which uses the induction of voltage on a plate as a means of transferring data or power.
Ellipse	An oval shape that is symmetrical on either side of its center when divided into quadrants.
Embossed	Characters or graphics that are raised above the remaining surface.
Enable	To activate or make able to function.
Encompass	To surround, encircle, or contain.
Error Correcting Code	(ECC) In RFID, supplemental bits in a data transfer used in conjunction with a polynominal algorithm in order to compute the value of missing or erroneous data bits. Example: for a 32-bit data transmission, seven additional bits are required.
Error Correcting Mode	Relative to RFID, a mode of data communication in which missing or erroneous bits are automatically corrected.
Error Correcting Protocol	Relative to RFID, the rules by which the error-correcting mode operates.
Error Management	In RFID, the techniques used to ensure that only correct information is presented to the system's user.
Error Rate	In RFID, the number of errors per number of transactions.
Exciter	In RFID, the electronics which drive an antenna. When coupled with antenna, they are collectively referred to as a scanner. Also referred to as a transmitter.
Expansion Port	A plug accessing additional 1/0 capability on a computer or peripheral device.
Eye-Mark Media	Print media with a mark on the paper backing between each label for the label sensor to read. This mark is used by the printer to identify the end of the printed label so that the next up can be properly positioned for printing.

GLOSSARY	
Factory Programming	Relative to RFID, the programming of information into a tag occurring as part of the manufacturing process resulting in a read-only tag.
Field Programming	In RFID, programming that usually occurs before the tag is installed on the object to be identified enabling the introduction of data relevant to the specifics of the application. However, the tag would typically have to be removed from its object.
Field Protection	In RFID, the ability to limit the operations that can be performed on portions of data fields stored in a tag.
Fillet	To round off the sharp edges of the angle.
Flange	The projecting rim of an object used to keep another object or objects in place.
Flash Memory	A form of rewritable memory chip that allows multiple memory locations to be erased or written in one programming operation. Flash Memory is very high-speed and non-volatile - does not need power to maintain the stored information. Its information is stored in an array of floating gate transistors called “cells”.
Font	A type or style of letter or numeral characters used in written text.
Frequency	The number of times a signal executes a complete excursion through its maximum and minimum values and returns to the same value. The number of vibration cycles.
Gap Media	Print media with a space between each label where only the paper backing exists. The printer’s sensor uses this “gap” to identify when the printed label ends and to properly position the next label for printing.
Gauge	A unit of measurement used to describe the nominal thickness of wire. The higher the gauge number, the smaller the diameter.
Gear	A system of toothed wheels meshed together so that the motion of one is passed on to the others.
Gigabytes	Used to describe data transfer rates or storage capacity of 1 billion bytes.
Groove	An elongated slot cut into an object.
Hertz	Radio waves or other electromagnetic radiation resulting from oscillations of electricity in a conductor. Also the measurement of those oscillations.
Hexidecimal	A numbering system composed of six letters (A-F) and ten numbers (0-9) used to condense binary numbers.
Hex Screw	A threaded rod having a flanged head that is comprised of six sides - a type of hardware used to attach two or more objects.
Hole	In engineering: a recess that does not penetrate completely through as a bore or orifice. Term may be casually used in lieu of a bore or orifice.
Horizontal	On a level plane ninety-degrees from vertical.
Hz	(Hertz) Radio waves or other electromagnetic radiation resulting from oscillations of electricity in a conductor. Also the measurement of those oscillations.
Icon	An image or picture that has a specific meaning.
I.D. Filter	In RFID, software that compares a newly read ID with those in a database or set.
Idle Gear	A toothed wheel that is not directly driven, but instead receives motion from another.
Idle Roller	A non-toothed wheel that is not driven - in the case of printers, it is typically used to provide tension on a timing belt. Also referred to as “tension roller”.
Illuminate	To give or emit light.
Inductive Coupling	In RFID, systems that use the inducing of a current in a coil as a means of transferring data or power.
Intermittent	Stopping and starting again at intervals.
In-Use Programming	The ability to read from, and write to, an RFID tag while attached to its object.
Junction	A place or point of joining or crossing.
Kinetic	The science dealing with the motion of masses in relation to the forces acting on them.

GLOSSARY	
Key	The button on a panel that may be pressed to send an electrical signal to influence a predetermined activity.
Keyed	A physical object shaped in a manner so as to prevent unwanted movement or to ensure desired movement.
Kg	(Kilogram) A unit of weight measure within the metric system.
Kilo-Bytes	Used to describe data transfer rates or storage capacity of approximately 1000 bytes.
Knob	A rounded handle to facilitate the manual opening, closing, securing, or otherwise movement of the object to which it is attached.
Knurled	An item that has recessed grooves or elevated areas on its surface to increase manual grip.
Label	Print media that has been used or printed upon that has adhesive on one side.
LAN Interface	(Local Area Network) A computer network limited to the immediate area, consequently capable of transmitting data at a very fast rate. Usually the computer is limited to the same building, or floor of a building, as the periphery device.
Latch	An object that is designed to be moved from one position to another for the purpose of preventing or allowing the opening of another object.
Lateral	Movement to the left or to the right - horizontal movement.
LCD	(Liquid Crystal Display) A display technology involving optical glass panels whose opacity can be controlled by electrical signals. A liquid crystal surface is sandwiched between two polarizing panels and when voltage is applied to certain areas, the crystal darkens. A light source behind the panel transmits through the transparent crystals and is mostly blocked by the darkened ones.
LED	(Light Emitting Diode) A semiconductor light source that emits visible light or invisible infrared radiation. The color of the emitted light depends on the chemical composition of the semiconducting material used.
Lever	An object that turns on a fixed point usually to engage or disengage a latch.
Laminate	A film or sheet placed onto and adhered flatly over another material.
Life	Relative to RFID, the functional period within which maintenance, adjustment, and repair is not reasonably expected.
Linear	The measurement of length without consideration of other dimensions.
Linerless Media	Print media that does not have a space between each label as does the eye-mark and gap type media. This media is continuous and is divided based on printer programming.
Link	An active connection to another document, graphic, or address. By selecting the designated button, text, graphic, or screen location; one is taken to the predetermined linked location.
M	(Meter) A unit of measure in the metric system equal to 39.37 inches.
MB	(Megabytes) Used to describe data transfer rates or storage capacity of approximately 1 million bytes depending on the manner of compression.
MM	(Millimeter) A unit of measure in the metric system equal to 0.03937 (1/25) inches.
Media	In printing, a batch of unprinted labels or tags.
Megabytes	Used to describe data transfer rates or storage capacity of approximately 1 million bytes depending on the manner of compression.
Menu	A display of items that may be chosen.
Meter	A unit of measure in the metric system equal to 39.37 inches.
Millimeter	A unit of measure in the metric system equal to 0.03937 (1/25) inches.
Module	A self-contained unit that may be plugged into another unit to operate.
Multimeter	A device that is used to measure output units relating to electrical current.
Memory Card	Relative to RFID, a read/write or reprogrammable tag in credit card size.
Memory Modules	A read/write or reprogrammable RFID tag.
Mobile Inventory Vehicle	In RFID, a vehicle equipped with a system for locating tagged vehicles, containers, and other objects for the purpose of inventory control.

GLOSSARY	
Modulation	In RFID, the methods of altering carriers in order to transmit the encoded information.
Nest	A set of similarly shaped objects with one smaller and resting within the other.
Nominal	The point between a positive and negative deviation which is considered to be optimum.
Nut	A small metal block with a threaded hole through its center for screwing onto a bolt.
Nylon Material	A milky-white, synthetic material used in manufacturing that is purchased in blocks and machined to the desired shape - resembles plastic.
Offset	In label printing, it is the repositioning distance that the printer must make after advancing the printed label for cutting or dispensing. The offset is the distance that the media must be retracted following one of those activities so that printing may again take place.
Omni-Directional	The ability of an RFID tag to operate in any orientation.
Orientation	Having to do with the manner or angle of placement.
Orientation Sensitivity	In RFID, the range or measurement of decreased readability by non-optimal orientation.
Orifice	An opening for which something is to pass through - similar to a bore.
O-Ring	A typically circular object made of round, elastic material to provide a seal between two objects.
Oscillate	To move back and forth along a span.
Pan Head Screw	A threaded rod with a rounded, flanged head used to attach multiple object together.
Paper	In printing applications, the temporary backing for print media. The paper is removed following printing so the label may be applied.
Parallel	Objects extending in the same direction maintaining the same distance part.
Parallel Interface	An interface between computer and printer where the computer sends multiple bits of information to the printer simultaneously by sending each bit over a separate wire.
Parameter	The span or area that something is allowed to exist or operate.
Parity	A simple form of error checking that is used in serial communication. A parity bit is a binary digit that is added to a group of bits to detect the presence of an error. The parity bit take on the value of an 0 or a 1 to satisfy a constraint on the overall parity of a binary number. The parity scheme in use must be specified as even or odd. Parity is even if there are an even number of 1 bits, and odd otherwise. None may also be chosen.
Passive Tags	Passive RFID tags that do not contain an internal power source. They are externally powered and typically derive their power from the carrier signal radiated from the scanner.
PC	(Personal Computer) An electronic computing device that may be individually and independently used or coupled to other similar devices.
Perforation	A series of through-holes in a material to facilitate tearing apart.
Perpendicular	At right angles to a given line or plane - a vertical line is perpendicular to a horizontal one and vise-versa.
Phenolic Material	A black, synthetic material used in manufacturing that is purchased in blocks and machined to the desired shape - resembles plastic.
Pinion Gear	A smaller gear meshed with a larger one.
Pitch	Physical top of form of media placed under the print head elements in the feed direction.
Plastic	A synthetic material typically rigid in nature that is molded to its useful shape. Plastic is typically injection molded along with its color additive and may be of any color chosen.
Post	A pin or shaft to which an object may be tethered or latched.
Potentiometer	A variable resistor used to adjust voltage to affect various mechanical activities. This electronic component is comprised of two terminals connected to either end of an resistive element and a conductor that can be moved between the two ends, thus allowing the creation of a resistor or voltage divider.
Primary	Something first in order or importance.
Print Assembly	The sub-assembly of a printer that comprise the printing components.

GLOSSARY	
Print Head	The device on a direct thermal or thermal transfer printer containing the heating elements that causes an image to be transferred to print media.
Processor	A programmable device that performs all the instruction, logic, and mathematical processing in a computer - is the brains of the computer. The processor is a microchip that is installed on a motherboard (primary board) that coordinates hardware components. Also referred to as “CPU”.
Profile	A side view of an item.
Program	To enter or send to the processor, the control parameters for electronic equipment to operate.
Proportional	To be equal.
Proximity Sensor	A device that detects and signals the presence of a selected object at, or near, the sensor’s location.
Pulley	A toothed wheel for providing movement to a belt.
Quadrant	One quarter of the circumference of a circle.
Radial	Branching out in equal distances from a common center.
Radius	A straight line from the center of a circle or sphere to its periphery - also the measurement of its distance.
RAM	(Random Access Memory) A network of electrically-charged points in which a computer stores quickly accessible data in the form of 0s and 1s. Each storage or memory cell can be directly accessed if the intersecting row or column is known.
Ratio	The quotient of one quantity divided by another of the same kind.
Reader	Relative to RFID, a device containing the digital electronics which extract and separate the information from the format definition and error management bits.
Read/Write	Relative to RFID, many applications require that new data or revisions to data already in the tag, be entered while it remains on the object. Some items with this capability of being re-programmable are read/write tags, memory cards, or memory modules.
Receive Buffer	An area of temporary data storage to help compensate for differences in the transfer rate and the processing ability of the printer.
Receptacle	A female connector to which a male connector may be inserted - typically for electrical current.
Relay	A simple electro-mechanical switch made up of an electromagnet and a set of contacts. Relays use a small amount of power to energize things that require a greater amount of energy. Sometimes relays are serial connected so that one smaller relay activates a larger relay which in turn, activates another larger still, and so on until the thing that is desired to be activated - is.
Retain	To keep or to hold in place.
Retract	To withdraw - the opposite of advance.
Resistor	A two-terminal electrical or electronic component that resists the flow of current producing a voltage drop between its terminals in accordance with Ohm’s law. This electrical resistance is equal to the voltage drop across the resistor, divided by the current that is flowing through it.
RF/AIS	(Radio Frequency Automatic Identification Systems)
RF/DC	Systems that communicate over a radio link between a host computer and a data source. RF/DC enhances the capabilities of automatic ID Systems by providing the capabilities of hare-wire data communications without the physical restrictions interconnecting wires.
RFID	(Radio Frequency Identification) A method of identifying unique items using radio waves. Typically, a reader communicates with a tag, which holds digital information in a microchip. But there are chipless forms of RFID tags that use material to reflect back a portion of the radio waves beamed at them.

GLOSSARY	
RFID Tags	A system of finding the position or location of assets. A microchip attached to an antenna that is packaged in a way that it can be applied to an object. The tag picks up signals from, and sends signals to, a reader. The tag contains a unique serial number, but may have other information and come in many forms, such as smart labels that can have a barcode printed on it, or can simply be mounted inside a carton or embedded in plastic. RFID tags can be active, passive, or semi-passive. Each tag broadcasts a signal to be received by three reader antennas. The time each signal is received is passed on to a software system that uses triangulation to calculate the location of the asset.
Ribbon	A thin, flexible strip with layers of material; one of which contains ink used to produce an image on print media.
Ribbon Core	A thick cardboard sleeve onto which ribbon is wound.
Rigid	Not flexible - stiff.
ROM	(Read-Only Memory) Also known as firmware, is an integrated circuit programmed with specific data when it is manufactured. There are five basic types: ROM, PROM, EPROM, EEPROM, and Flash Memory. Each type has unique characteristics, but they all are types of memory that have two things in common: the stored data is non-volatile (not lost when power is removed) and the stored data is unchangeable or requires a special operation to do so. ROM chips contain a grid of columns and rows. A diode is used to connect the lines and gain access to the data if the value is 1. If the value is 0, the lines are not connected and access is denied.
RPM	(Revolutions Per Minute) The number of cycles within the time span of one minute.
Route	The path or course taken to get from one location to another - example: the routing of a cable within a machine.
SAM	(Serial Access Memory) Stores data as a series of memory cell that can only be accessed sequentially. Works very well for memory buffers where data is normally stored in the order in which they will be used.
SBPL	(SATO Basic Programming Language)
Scale	The units to measure distance - or a short tool for measurement. To increase or decrease the proportionate size of an object - example: text or graphics on a printed label.
Scanner	In RFID, an antennas transmitter and receiver electronics integrated in a single package.
Screen	An electronic display.
Seat	To nest or couple one object to another. The same as to nest.
Secondary	The next to follow the primary in sequence or importance.
SEMBL	A SATO specific mode of printer operation that can execute the program of BASIC format in the printer. This allows the printer to be configured and operated without interfacing with an external computer or software.
Sensitivity	The degree of ease or difficult to gain a response - example: a sensor transmitter signal may require increase to penetrate the thickness of print media in order to be receipted by its receiver.
Sensor	A device that responds to a physical stimulus and produces and electronic signal.
Separation	The operational distance between two RFID tags.
Sequential	One to follow another in a specified order - examples: 1, 2, 3; A, B, C.
Serial Interface	A general-purpose interface that can be used for almost any type of device in which only 1 bit of communication is transmitted at a time.
Set Screw	Attachment hardware specifically used to secure an object may be moved in a specific position or location.
Shaft	Any rod, bar, or tube.

GLOSSARY	
Simultaneous	To take place at the same time.
Sleeve	A thin hollow material that is inserted onto another to provide proportionate spacing.
Snap Ring	A circular clip that may be applied to a shaft, etc. to prevent another object from moving - used to retain objects in position.
Solid	An item that is not porous.
	An item that is not transparent or translucent.
Spacer	Any object of purpose to maintain a specific distance from two other objects - example: a sleeve or washer.
Spindle	A shaft or rod that is fixed on one or both ends and spins on its axis while maintaining its projection.
SRAM	(Static Random Access Memory) A type of memory that is faster and more reliable than the more common DRAM. The term *static* is derived from the fact that it doesn't need to be refreshed like DRAM.
Stainless Steel	A shiny, mirror-like carbon steel alloyed with chromium to inhibit rust.
Steel	Metal that contains a specific percentage of carbon. The percentage of carbon determines its strength, in addition to how prone it is to rust.
Stepper Motor	An electrical motor designed to rotate in both directions and to move in incremented distances.
Sub-Assembly	A group of components assembled to form a complete unit that is a part of a larger unit.
Switch	A small mechanical device when altered sends an electrical signal to influence a predetermined activity. Unlike a button or key, switches may have multiple positions.
Tag	Relative to RFID, the transmitter/receiver pair of transceiver plus the information storage mechanism attached to the object. Also referred to as Transponder.
Thermal Transfer	The printing method that creates an image by transferring ink from a heat activated ribbon onto the media using the heat from a thermal printhead. A printhead is composed of a set of pins referred to as "elements" which may be selectively heated through electrical induction. Regular paper media is used in this application in conjunction with the heat sensitive ribbon. The ribbon deposits a coating of dark material onto the paper when exposed to intense heat. Thermal transfer printing is more durable than direct thermal printing and is often used when a label needs to endure longer than a year.
Thermodynamics	The science that deals with the relationship of heat and mechanical energy - also the conversion of one into the other.
Threads	The spiral grooves on the shaft of a screw,
Three-Dimensional	The three projectories of an object: X axis is the distance left and right, the Y axis is the distance up and down, and the Z axis is the distance inward and outward.
Torsion Spring	A piece of wire bent into a spiral and connected on each end by different objects to allow them to be pulled apart and then automatically return to their original position once released.
Transformer	A device used to increase or decrease electricity's voltage and current. The device consists of one or more windings (typically copper) which, the ratio of the number of turns inversely determines the voltage change. The windings are wrapped around a magnetic core affecting magnetic induction.
Transistor	A device used to amplify a signal or open and close a circuit. Is constructed of a semiconductive material and is comprised of three terminals where one can be used to control the flow of current through the other two.
Translucent	When a medium is of a condition so as to allow light to filter.
Transparent	When a medium is of a condition so one can see through it unfettered.
Transponder	Relative to RFID, the transmitter/receiver pair of transceiver plus the information storage mechanism attached to the object. Also referred to as Tag.
Tread	The act of an object making repetitive contact upon another that is in motion.

GLOSSARY	
Troubleshoot	The act of locating the source of a problem or problems.
Two-Dimensional	Two of the projectories of an object: X axis is the distance left and right and the Y axis is the distance up and down. In a two-dimensional perspective, the Z axis is not recognized.
Uniform	The state of multiple objects being the same.
Units	Any fixed quantity, measure, etc.
USB Interface	(Universal Serial Bus) An external peripheral interface standard for communication between a computer and external peripherals over a cable using bi-serial transmission.
Value	The quantity for which a symbol stands.
Vertical	A plane or axis that is plum - the Y axis.
Voltage	The units of electrical force - the ampere current that flows through a conductor.
Volume	The amount of space occupied in three dimensions - cubic contents.
	The strength or loudness of sound.
Washer	A flat disk of metal, rubber, etc., used to make a seat for the head of a bolt, screw, or nut.
Wattage	The amount of electrical power to operate an electrically powered device - arrived by multiplying amperage by voltage.
Wear	To diminish in quality by repetitive activity.
Wireless	Operates with electromagnetic waves and not with conducting wire.
Wiring Harness	Multiple electrical wires bundled together.
X-ON/X-Off	A protocol for controlling the flow of data between computers and other devices on an asychronous serial connection. For example, a computer typically sends data to a printer faster than the printer can print. The printer contains a buffer where data is stored until it catches up, a small microprocessor in the printer sends back an Xoff signal to stop sending data. When enough data is printed and the buffer storage becomes free, the printer sends an Xon signal to resume sending data.